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NOTE FROM THE EDITOR

ANGELINA DAVYDOVA,
Editor-in-chief

Dear readers,

We are pleased to present a new edition of our magazine "Environment and Rights". This issue focuses on the Arctic, a region experiencing the fastest climate change on the planet. It is surrounded by countries with complex political relations, particularly in light of Russia's invasion to Ukraine. This region is where various factors, such as foreign policy, economics, and the environment, intersect.

Our authors, some of whom still publish under pseudonyms for security reasons, delve into topics such as how international cooperation in the Arctic has evolved since the onset of the war, Russia's plans for further development in the region, ongoing and planned infrastructure projects in the Russian Arctic, and the issue of the Arctic's nuclear legacy amidst ceased international cooperation. We also explore the development of the Northern Sea Route, including concerns regarding industrial pollution and environmental risks in the region.

Climate change, both observed and predicted, remains a crucial issue for the Arctic. Our contributors have studied the latest scientific publications, analyzed existing adaptation plans for Arctic regions, as well as the strategies and actions of federal and local authorities, public organizations and initiatives. Some of these organizations have recently been labeled as "foreign agents" or "undesirable organizations" due to their active work in Arctic regions.

In this issue, we feature Dmitry Berezhkov, the first political refugee representing the indigenous northern peoples of Russia, and Udege Pavel Sulyandziga, the only foreign agent among the indigenous peoples of the Arctic. They discuss the impact of the war in Ukraine on the rights of indigenous peoples in Russia and shed light on the largest environmental protest campaigns in Russia's Arctic regions, along with the consequences of international environmental organizations leaving Russia.

Furthermore, Katja Doose, an environmental history researcher at the University of Friborg, provides a historical overview of Arctic cooperation dating back to the 19th century. Researcher Anne Morgenstern, who specializes in permafrost issues at the Alfred Wegener Institute in Germany, shares insights into international scientific research programs in the Arctic since the start of the Russian invasion to Ukraine.

We hope this new edition of our magazine proves informative and engaging for you. We welcome your feedback, ideas, and proposals for collaboration. Please feel free to reach out to us at ecopravo@bellona.org.

The ice is not broken

How international cooperation in the Arctic has changed since the war began

BY YEVGENY ANISKOV

Russia's invasion of Ukraine in February 2022 was a breaking point in relations between the West and Russia. The war has also had a negative impact on cooperation in the Arctic. After warfare began, joint initiatives were suspended, such as the Arctic council and the Barents Cooperation. Furthermore, additional sanctions were levelled against Russia, which not only put an end to official contacts concerning environmental problems of the Arctic, but also threatened joint work of scientists and non-governmental organizations.

Right up until the war began, the Arctic remained a zone of cooperation between Russia and western countries. The other Arctic countries besides Russia are the USA, Canada, Norway, Denmark, Iceland, Sweden and Finland. Just one day before Russia's full-scale invasion of Ukraine, on 23 February 2023, Russia's ambassador to Norway read a telegram of welcome from Russian foreign minister Sergei Lavrov at a conference in Kirkenes on socio-economic and industrial development of the Far North. The telegram spoke of "mutual assistance and good neighborly relations" and also the "unprecedentedly high level of border ties".

The Arctic as a point of military confrontation

After the war in Ukraine began, the Arctic began to be examined both by Russia and other Arctic countries as a strategic zone from the standpoint of military security. By the summer of 2023, all seven Arctic countries had joined NATO (Sweden is at the final approval stage), which Russia perceived as a threat. Before the crisis in relations, there had been hybrid conflicts in the Arctic between Russia and the West. In October 2020, Norway accused Russia of a hacker attack on the country's parliament. In October 2021, Oslo objected to training exercises in the south of the Norwegian Sea, which created malfunctions in GPS navigation in the north of the country. The Norwegian authorities discovered a severed IT cable servicing Spitzbergen – suspicion fell on Russian fishing ships. After 24 February 2022, Russian tourists were detained in Norway after they violated the ban on using drones in the country.

Experts on international relations single out three main military reasons why Russia wishes to strengthen its position in the Arctic. Firstly, the Arctic has decisive significance for strategic nuclear containment against NATO. In a conflict with NATO, Russia may deliver a responsive strike by ballistic missiles (including missiles with nuclear warheads) from submarines in the Barents Sea. Secondly, the Arctic opens the route to the North Atlantic, which is also important during a military conflict. The third reason involves the military defense of Russia's economic interests, primarily the use of the Northern Sea Route (NSR) and hydrocarbon exploration.

After relations between Russia and western countries worsened, the foreign policy concept of the Russian Federation was changed, and the new edition was published in March 2023. The paragraph concerning the Arctic was doubled in size and became more detailed. Now one of the main provisions concerns the "development of the Northern Sea Route as a competitive national corridor with the possibility of its international use for transportation between Europe and Asia". The text describes this as "ensuring the continuity of the historically established international legal system of internal sea waters of the Russian Federation."

It should be noted that in the new concept, Russia's foreign policy in the Arctic becomes a continuation of its domestic policy. The text of the concept not only includes Arctic countries, but other countries with interests in the Arctic as well. It is not difficult to guess that this primarily concerns China, which

Signs warning of polar bears at Longyearbyen Airport. Longyearbyen, Norway, is a former mining town and the capital of Spitsbergen..
Photo: iwciagr / www.shutterstock.com
https://www.shutterstock.com/ru/image-photo/longyearbyen-norway-25-july-2023-polar-2348653933

is potentially interested in investments in the NSR and other Arctic projects, for example oil production.

Additionally, Russia is attracting other Asian countries to the Arctic, for example India, Turkey and the United Arab Emirates. The Russian company NOVATEK, after sanctions were levelled by western countries, contacted the company Green Energy Solutions from the UAE concerning cooperation in the field of technologies for gas liquification, and also the Turkish company Karpowership for assistance in building a floating power plant.

Pavel Devyatkin, senior scientific associate and member of the managing group of the Arctic Institute (Washington) and Nikita Lipunov, an analyst at the department of strategic development of the International Research Institute at the Moscow State Institute of International Relations, in the article "The Arctic and the Russian Concept of Foreign Policy until 2023" published in May, note that the emphasis of Russia's Arctic policy has shifted towards developing the Russian Arctic, and that international cooperation now pursues this goal.

The experts believe that, overall, Russia no longer aspires to become integrated into the western community, and that its institutions are no longer regarded as a value or marker of status. In its new foreign policy concept, Russia has chosen to take a pragmatic approach, despite the toughening in rhetoric. Rejecting existing institutions and closing doors is not part of the country's plans. Instead, Russia, intends to use these institutes only if this corresponds to its national interests, on the condition that other participants also take these interests into account.

The analysts note that the Arctic section of the concept starts with words about preserving peace and stability, raising the environmental sustainability in the Artic and ensuring "favorable international conditions for the socio-economic development of the

Flags of the eight member states of the Arctic Council and six indigenous organizations that are permanent participants.
Photo: Arctic Council Secretariat / Linnea Nordström
https://www.flickr.com/photos/arctic_council/22384326841

Arctic zone of the Russian Federation". Additionally, Russia formally remains an adherent to international law in the Arctic, upholding the UN Convention on the Law of the Sea (UNCLOS) for regulation of intergovernmental relations in the Arctic Ocean.

Since the war in Ukraine began, the USA has also reviewed its policy on the Arctic. The new national strategy for the Arctic region was developed by the National Security Council. Now security is the cornerstone of the country's Arctic strategy. Like the Russian concept, the strategy begins with the words that "the United States seeks an Arctic region that is peaceful, stable, prosperous, and cooperative." Besides security, the USA's Arctic strategy concentrates on conservation of the environment, sustainable development, human health and the role of native communities and other residents of the Arctic region as interested parties in the Arctic.

Concerning military security in the Arctic region, western experts do not foresee direct conflicts between NATO members and Russia. Andreas Østhagen, senior researcher of the Fridtjof Nansen Institute (FNI) in his report "The Arctic after Russia's invasion of Ukraine: The Increased risk of conflict and hybrid threats", published in May 2023, notes that Russia is unlikely to engage in direct conflict in the region, as there are no large-scale disputes in the Arctic that might cause a military confrontation. He notes that Russia is not interested in an open conflict with NATO, as this will have serious consequences for it. Østhagen believes that Russia's actions will probably be of a hybrid nature and remain below the threshold of open war.

The Arctic Council

The main institution of international cooperation of Arctic nations is the Arctic Council. Its history began with the Arctic Environmental Protection Strategy (AEPS), which all eight Arctic countries joined in 1991. Four workgroups were created in the AEPS, which conducted monitoring and evaluation of the state of the environment, conservation of flora and fauna, preparation for emergency situations and protection of the maritime environment.

Five years later in September 1996 on Canada's initiative, the Declaration on creation of the Arctic Council (AC) was signed. Its goal is to expand the activity of the APES for solving issues of sustainable development in the Arctic. Primarily, the AC works as an organization for controlling the environmental situation in the Arctic, annually publishing reports on the influence of human activity on the climate. The Arctic Council can only recommend certain decisions, and their realization remains at the discretion of each country individually, as the AC does not have the authority to apply sanctions for non-observance of its decisions.

Among other things, members of the Arctic Council sign agreements on search and rescue operations, tidying up oil slicks, and scientific cooperation. Even despite Russia's annexation of the Crimea in 2014, when there was a cooling in relations between Russia and western countries, the connection between countries in the AC remained strong.

Suspension of work by the Arctic Council

After Russia's full-scale invasion of Ukraine, all seven member countries of the Arctic Council decided to suspend participation in sessions of the council and its auxiliary bodies. The countries condemned "Russia's unprovoked invasion of Ukraine", and also pointed out serious obstacles for international cooperation. At the moment that the AC suspended activity, Russia held the chair.

For over a year, until Norway assumed the chair of the Arctic Council in 2023, the council's activity was suspended and information on the website was not updated, so it was not possible to learn about what was happening with projects launched previously. The website contains no updated information on projects which were supposed to be realized during Russia's chairmanship (2021-2023). There are 128 projects listed, including treatment of waste in remote Arctic settlements or clarifying the consequences of climate change for Arctic ecosystems.

The last major event held by the Arctic Council was a ministerial meeting in May 2021 in Reykjavik, where a regional action plan to promote cleaner oceans was passed. The plan consists of around 60 different strategic measures to reduce marine litter in the Arctic. This includes waste management in fishing, aqua culture, shipping and at seaports, as well as measures to promote cleaning arctic coastlines, increasing studies and monitoring and expanding international cooperation.

Additionally, at the Reykjavik meeting, the first strategic plan of Arctic cooperation in history was passed, concerning climate change, environmental conservation and sustainable economic development in the Arctic. The plan encompasses the period of 2021-2030 and is a key tool for cooperation in attaining UN sustainable development goals. The countries also coordinated measures at the meeting for the health and safety of peoples living in the Arctic, and to consolidate the general knowledge database.

Suspension of Arctic cooperation has undoubtedly aggravated existing regional problems, especially in climate change and resource development. A significant loss was the closure of access to Russian data on biodiversity for western scientists. Serafima Andreeva, a researcher at the Nansen Institute (FNI) in an article published in the journal "Arctic Review on Law and Politics" in May 2023, notes that Russia has extensive databases on biodiversity, but that the majority of them have yet to be converted to digital format, which forces researchers to rely on access to this information through individuals.

Norway's chairmanship on the Arctic Council

On 11 May 2023, Norway took over the chairmanship in the Arctic Council from Russia at the 13th session of the AC, which was held in Salekhard in online format. According to Norwegian foreign minister Anniken Huitfeldt, the most important task is saving the Arctic Council itself, although she is not certain that this goal will be successful.

A representative of the Russian Foreign Ministry and chairman of the Committee of senior officials of the Arctic Council Nikolai Korchunov said that the issue of Russia's participation in events during the Norwegian chairmanship was out of the question. He also stated that Russia's exclusion from the Arctic Council's projects was a violation of its rights as a member nation. "In this case, the continued participation of our country in the activity of this organization will probably not be possible," said the ambassador in an interview with TASS. He also sees no future in the Arctic Council without Russia's participation, as the council's work is primarily based on joint initiatives.

During its chairmanship on the Arctic Council, Norway plans to focus on projects that are not connected with Russia. In March 2023, Canada and Norway published a joint declaration on bilateral cooperation, stating among other things that both countries are "jointly committed to a peaceful and stable Arctic".

In June, Norway held the first meeting with heads of six work groups of the Arctic Council and the Expert group on black coal and methane (EGBCM). Norway's Arctic policy during its chairmanship on the Council will be based on four priority topics and 22 sub-points: the oceans; climate and the environment; sustainable economic

ARCTIC COUNCIL

STATES

- Canada
- The Kingdom of Denmark
- Finland
- Iceland
- Norway
- The Russian Federation
- Sweden
- The United States

ORGANIZATIONS

- Aleut International Association
- Arctic Athabaskan Council
- Gwich'in Council International
- Inuit Circumpolar Council
- Russian Association of Indigenous Peoples of the North
- Saami Council

development; improving the well-being of people living in the region.

As far as interaction with Russia is concerned, Norwegian politicians do not express clear and specific positions. Until 24 February 2022 Norway was perhaps Russia's closest partner in the Arctic, primarily because of its geographical location (both countries have direct access to the Arctic Ocean and a common land border). This could be observed in the joint use of the Spitzbergen Archipelago or the Barents Sea both for economic and conservation purposes.

Officials contacts between Russia and Norway continued until the very end. In late 2021 Russian Foreign Minister Sergei Lavrov made a two-day visit to Norway. Four "soft" topics were outlined in which cooperation between Moscow and Oslo was important: joint management of fishing resources in the Barents Sea; conservation of coniferous forests; intensifying contacts of residents of border regions, and cooperation on climate and the environment. No one can predict whether the ecological agenda will become a point of return to normalization of relations between the two countries. Experts believe that this will depend to a significant degree on Russia's actions, which should demonstrate the observance of international law and international obligations.

For intercultural and economic cooperation of the Arctic countries of Europe, in Kirkenes, Norway in 1993 the platform of the Barents cooperation was created, which besides Norway and Russia also included Sweden and Finland, After the war in Ukraine began, the decision was passed to close all offices of the Barents Secretariat in Russia (Arkhangelsk, Murmansk and Naryan-Mar). However, the Secretariat noted that there were intentions to continue support of Russian-Norwegian projects that can be realized under sanctions.

Is it possible to revive the Arctic Council in its previous form?

Experts on international affairs, both Russian and foreign, realize the need to restore relations between Russia and the West on the platform of Arctic cooperation in the future. Some propose to look for a solution now, while the war continues. Evan T. Bloom, senior researcher at the Polar Institute of the Wilson Center, believes that the Arctic council without Russia will become a weaker and less effective organization. "It is important to consider what sort of cooperation can continue despite the conflict in Ukraine," he wrote in his article "A new course for the Arctic Council in uncertain times," published in March 2022. He believes that the goal of the AC should be to restore cooperation between countries.

Aaja Chemnitz Larsen, a Greenlandic lawmaker at the Danish parliament and the Chair of Arctic Parliamentarians, told Reuters in May 2023: "I don't see an Arctic Council without Russia in the future". Gabriella Gricius, PhD Candidate in Political Science, Colorado University, believes giving up on cooperation would be a mistake. She says a "cooperation spiral" is required which could help lessons tensions in other regions. "Even if collaboration were confined to the Arctic, this would boost global security," Gricius wrote in April 2022 in an article for The Conversation.

David Balton, the executive director of the Arctic Executive Steering Committe e in Washington, DC, also expressed support for establishing cooperation with Russia in the Arctic. "Following the invasion of Ukraine, the question arose: Do we really imagine an Arctic that is both peaceful and cooperative? But at the end of the day, we decided that the answer is yes," he told Arctic Today. Such statements by officials suggest that the probability of creating Arctic regional institutions without Russia's involvement is low.

In their turn, Pavel Devyatkin and Nikita Lipunov do not yet see any actions on Russia's part to bring about a full break in international ties and create new organizations. "Russia does not intend to create alternative platforms, and so far remains attached to constructive international cooperation within existing and tested regional mechanisms," the experts conclude. Other members of the Arctic Council do not propose to create alternative formats of cooperation either. According to Nikolai Korchunov, this shows that the "Arctic Seven" regards the situation as temporary. He also said that Russia is looking for possibilities to implement the decisions that were passed at the ministerial meeting in Reykjavik in 2021.

Work in the Artic without Russia's involvement will be significantly complicated, primarily for geographical reasons. Russia has the longest stretch of coastline in the Arctic, around 50% of the total; additionally, the largest percentage of the population lives in Russian Arctic territories. The Russian economy is also most strongly connected to production of resources. Despite this, according to a number of experts, unless Russia changes the nature of its foreign policy, it will be difficult to continue cooperation with it.

Various proposals have already been made about how to remove Russia from Arctic cooperation. Elis Rogoff, cofounder of the international organization Arctic Circle, examines the possibility of reformatting the Arctic Council as Arctic Council 2.0 without Russia's involvement, which she wrote about in her article "It's

Working in the Arctic without Russian participation will be significantly more challenging for geographical reasons: the Russian Arctic coast is the longest and occupies more than 50% of the whole coastline. Additionally, the Russian Arctic territories are home to the largest population.
In the photo: Murmansk during a polar night in December 2021.
Photo: Kirill Skorobogatko / www.shutterstock.com

https://www.shutterstock.com/ru/image-photo/murmansk-russia-december-2021-attractions-town-2096644162

time for an Arctic Council 2.0" in March 2022. A similar idea on creating a new council was proposed by Stefan Kirshner, professor at the University of Lapland. In the article "International Arctic Governance without Russia", published the day after the war began, he discussed the creation of Nordic Plus, a platform for interaction between Europe and North American in the Arctic.

It should be noted that the Arctic Council is not the only body regulating cooperation in the region, and a temporary pause in its work does not mean an end to regional cooperation. A considerable amount of cooperation in the Arctic is implemented outside this platform. Arctic nations actively interact, holding numerous scientific studies in the region without the involvement of Russia or the Arctic Council. Scientists from various countries, for example the USA, Canada and Finland, continue cooperation. Even within the Arctic Council some events may take place without Russia's participation. The Arctic Council does not regulate the activity of Arctic nations, and these nations are not obliged to contact the AC to coordinate rules regulating shipping, aviation, oil and gas production, for example, or other important issues in the region.

There is also no question of complete suspension of intergovernmental cooperation with Russia. This primarily concerns emergency situations in the Arctic region. Since 24 February 2022, the USA and Russia have maintained cooperation in safety at sea in the Bering Strait. This cooperation concerns search and rescue work, tidying up oil spills, law-enforcement activity and management of fishing. However, joint training exercises of the shore guard of the two countries have been suspended. Similarly, Norway has suspended cooperation with Russia in nuclear safety, but maintains channels of contact in the case of emergency situations and for exchanging information.

Citizen diplomacy

Despite the breakdown of relation between Russia and the other Arctic nations, there is at present still limited room to restore cooperation, primarily through scientific and citizen diplomacy. Pavel Devyaktin, in the article "Can Arctic cooperation be restored?" of 28 March 2023 suggests that non-state actors, such as researchers, will now play an especially important role, as cooperation at state level has been frozen. Sanna Kopra, senior fellow at the Arctic Institute (Washington) also believes that cultural and educational events and programs

The governments of the Arctic states recognize a key role of indigenous peoples in the sustainable development of their territories.
In the photo: Dwellings of reindeer herders in the foothills of the Polar Urals, Yamalo-Nenets Autonomous region, Russia.

have decisive significance for "long-term peace building and creating a collective desirable future". Experts suggest that countries' governments may be indirectly influenced by researchers, indigenous peoples, non-governmental organizations and civil society as a whole, which perhaps will lead to a restoration of cooperation between nations.

The indigenous peoples of the Arctic region are often seen as playing the role of citizen diplomats. Practically all concepts and doctrines of developing the Arctic mention indigenous peoples. The governments of Arctic countries give them one of the key places in sustainable development of territories and include the interests of indigenous peoples in many programs. Russia also included the interests of indigenous peoples of the North for the first time in the updated version of its foreign policy concept. It is in interaction of indigenous peoples of the Arctic that experts see the path that citizen diplomacy between Russia and other Arctic countries may take.

However, almost immediately after the war in Ukraine began, difficulties arose in relations between northern indigenous peoples living in Russia and other countries. The association of indigenous peoples of the North, Siberia and the Far East of Russia published a statement on 1 March 2022 in support of Vladimir Putin's actions in Ukraine. They stated that "for eight long years they had preserved the hope that human rights in Ukraine would be restored". They also stated that they supported the "decision taken to defend the rights and interests of the residents of the Donetsk and Luhansk people's republics".

Photo: Karasev Viktor / shutterstock.com
https://www.shutterstock.com/ru/image-photo/three-wigwams-modern-reindeer-herders-against-2276585799

The signers of this letter included the president of the Association of Kola Saami, which is part of the international Saami Union. After the letter justifying the invasion of Ukraine was signed, the Saami Union suspended cooperation with its Russian member organizations. The association of Kola Saami closely interacts with the local authorities, and is part of the Public chamber of the Murmansk Oblast for issues of indigenous peoples, which makes it politically dependent. Representatives of indigenous peoples who do not support Russia's actions are forced to leave the country, as they are threatened with imprisonment for their position.

Cooperation in science also faces certain difficulties. Western scientists no longer have the opportunity to visit Russia to conduct scientific studies or obtain necessary specimens. Considerable restrictions for Russian scientists are also imposed by western countries. It has become more difficult for Russians to receive visas required in all Arctic countries because of sanctions, which limits their participation in conferences and informal work. Russian scientists also find that their access to international scientific databases to blocked. Additionally, foreign organizations are increasingly afraid to work with citizens of Russia, to avoid incurring repressions against them by the Russian state.

Scientists sound the alarm, as all knowledge about the climate in the Arctic is threatened. "We are in total isolation; we are sanctioned everywhere. Who will care about the climate?" Russian scientists working on the environmental problems of the Arctic said in an interview with Serafima Andreeva. Andreeva states that individual researchers become vulnerable as they risk losing researcher networks which took time to develop. "The long-term risk of weakening researcher networks affects work in the Council and the future of Arctic climate science," she writes.

Besides direct restrictions by western nations, Russian scientists also face dangers inside the country. Cooperation of individual scientists from Russia with scientists from other countries may be regarded as treason (all of the seven remaining Arctic nations are on the list of countries hostile to Russia). There has already been a precedent for this which took place in 2020. Valery Mitko, president of the Arctic Academy of Sciences in St. Petersburg, was charged with treason for cooperation with China. Two years later he died while under house arrest.

The rift in international cooperation in the Arctic was inevitable in the current crisis between Russia and western countries. Nevertheless, one should remember that regional contacts and cooperation serve the interests of all Arctic nations, as well as of indigenous peoples and local communities. Now diplomats, scientists and noncommercial organizations are looking for forms of cooperation which could be preserved even during the continuing conflict in Ukraine.

In light of the important role that Russia plays in the Arctic region, the governments of Arctic countries understand the need to restore relations with Russia in the future. Unification of all Arctic nations in the long-term perspective is important for solving the challenges and problems that are faced by the Arctic, such as climate change, preserving ecosystems and sustainable use of natural resources.

“Everyone knows that science is international”

Arctic research without Russia?

BORIS SCHNEIDER SPOKE TO DR. ANNE MORGENSTERN

Anne Morgenstern

- Has been doing Arctic field work for 15 years, mainly in Siberia.
- Scientific focus: degradation of ice-rich permafrost by thermokarst and thermal erosion.
- Has coordinated the German part of the joint Russian-German LENA expeditions to the Lena Delta region (organised annually since 1998 and used the ‘Samoylov Island’ research station as its logistical and scientific base.
- Together with numerous Russian partner institutions, she has coordinated AWI’s scientific cooperation with Russia across almost all research topics investigated at AWI.

After Russia began its full-scale invasion of Ukraine in February 2022, most research collaborations with Western partners were stopped abruptly. This includes the research of the Arctic region, which to a large part is Russian territory. What does it mean for the daily work of a Western scientist and how to continue research under such conditions? Dr. Anne Morgenstern, a scientist dealing with permafrost research at the Alfred Wegener Institute in Bremerhaven, Germany, shares her experience.

What has changed in scientific cooperation with Russia on Arctic topics since the beginning of the full-scale invasion last year in February.

There have been drastic changes. So, a few days right after the war started, many Western countries stopped the scientific cooperation with Russia. And that was a really quick and drastic decision. And this is the situation until today. So, the institutional cooperation with Russian state institutions is paused. Not only from the German side, but also for many other Western countries. And this means that Arctic research from the Western side is now kind of restricted to the Western Arctic. And if you look at the map, you will find that half of the Arctic is Russian territory, which means that access to this part of the Arctic is no longer possible for Western researchers. And this means that Western researchers cannot go to the field in the Russian Arctic. They cannot maintain long-term observatories there, which they had operated together with Russian partners. They won't receive sample materials from those regions anymore. And it's also affecting the exchange, the scientific exchange in general, because meeting with Russian researchers during conferences or during other occasions has been drastically decreased. And this affects the whole research and science development concerning the Arctic.

And how are non-Russian researchers conducting research on the Arctic under those conditions?

So, for accessing the Arctic itself, they are now shifting to other Arctic regions. Of course, there have always been collaborations, for example, from our institute with other countries as well. Alaska, Canada, Svalbard and so on. So the regional focus is now shifting towards those regions that are accessible. The Russian Arctic is so highly relevant for the science community in terms of climate warming. The Arctic is warming nearly four times as fast as the rest of the globe. And it's really important to continue looking at these regions and observing the changes and trying

Permafrost in summer on the Syadotayakha River, Priuralsky district, Yamalo-Nenets Autonomous Okrug, Russia.
Photo: Malupasic / commons.wikimedia.org

https://commons.wikimedia.org/wiki/File:%D0%92%D0%B5%D1%87%D0%BD%D0%B0%D1%8F_%D0%BC%D0%B5%D1%80%D0%B7%D0%BB%D0%BE%D1%82%D0%B0_%D0%BB%D0%B5%D1%82%D0%BE%D0%BC_%28%D0%A1%D1%8F%D0%B4%D0%BE%D1%82%D0%B0%D1%8F%D1%85%D0%B0%29.jpg

to understand what drives them and how they will progress in the future. Now without direct access, people try to continue studying those regions, for example with remote sensing, meaning that they use satellite data or also modelling studies are still pursued for those regions.

Is there any access to data in Russia? Can you access it from Germany or from abroad? And if so, how is that possible?

If the data that is acquired in Russia by Russian colleagues is published to the international community on international platforms or databases or within publications that are accessible, then

WHAT PERMAFROST RESEARCH PROJECTS LOOK LIKE:

Going into the field to investigate specific landforms of permafrost degradation (e.g. gullies, valleys, lakes, and lake basins), taking samples of sediments and water, which are later analyzed in the laboratory for contents of organic carbon and other substances.

Analyzing these and additional landforms over larger regions using satellite images and geographical information systems (GIS) at home.

Combining the knowledge gained from field work with the results from spatial analyzes to derive a process understanding of permafrost degradation over space and time.

Scientific vessel of the Polarstern expedition.

THE MOSAiC EXPEDITION:

mosaic-expedition.org/expedition/mosaic-in-numbers/

- Would not have been possible without the participation and support of Russian partners that have decade-long experience with Arctic drift expeditions, both logistically and scientifically.
- Russian researchers participated onboard the Polarstern over the whole period, while Russian icebreakers accomplished a crew exchange and guaranteed the supply of Polarstern.
- During the first phase of the expedition Polarstern was accompanied by the Russian research vessel Akademik Fedorov to identify a suitable ice floe and to set up the Distributed Network of autonomous measurement systems in a radius of 50 km around the central observatory at Polarstern.
- On Akademik Fedorov, she helped to facilitate communication between Russian and international participants and crew members.

of course this data can be used. But for directly transferring data from Russia to the West: that always, I mean, also in the past, that has always been regulated by laws concerning export procedures. So, depending on the type of data, there are more or less strict rules. And now this has been a much greater challenge that now the data that is being acquired in Russia is to a much lesser degree accessible to the West.

Where and how have you been in the Russian Arctic? And what have you explored before?

I am a permafrost scientist, so I have been working in the Siberian Arctic during the last years. And my field work took me mostly to the Siberian Lena River Delta. I have been studying the degradation of ice-rich permafrost deposits there. And that was since 2008, since my first expedition to the region. But already before, I got to know permafrost: during my university studies. I spent a year in Siberia, in Irkutsk actually, and got the opportunity to participate in a student field practice in Yakutia and there I got to know permafrost myself and ever since got attached to it, so to say. And during my scientific career, I was also developing my coordination work. I was responsible for coordinating our scientific cooperation with Russia, our means of the Alfred Wegener Institute for Polar and Marine research. And in that function, I also participated in the first leg of the Mosaic expedition. So, I was part of the scientific crew on board the Russian icebreaker, Akademik Fyodorov, which accompanied

https://en.wikipedia.org/wiki/MOSAiC_Expedition

Other Arctic-related research projects Anne Morgenstern and the Alfred Wegener Institute were involved in:

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

- Represented the Samoylov Island research station within the EU-funded International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT; eu-interact.org/)

- Organised the Lena River water monitoring program (lena-monitoring.awi.de/), for which the Samoylov Island staff had collected samples from the Lena River every few days over a period of four years to trace changes of the chemical composition of the water and relate these to seasonal and interannual changes in the watershed that are to a great extend related to climate change. This high temporal resolution monitoring was unique in the Arctic. Due to the cooperation freeze, this research had to end in the Lena River. In May 2023, Morgenstern and her colleagues started a similar high-resolution water sampling program in the Canadian Mackenzie River and are hoping to develop it into a long-term program.

the German research vessel Polarstern into the Central Arctic Ocean.

And are there any personal contacts with Arctic scientists in Russia that you know of or is that not even possible within the current state of affairs?

It is still possible. I mean, it is depending on the regulations and for example for Germany the Federal Ministry for Science and Education issued guidelines how to deal with the cooperation stop and it's explicitly mentioned that personal contacts to scientists or anyone related to science on the personal level or on a low technical level, can and should still be maintained, because the individual people are regarded as representatives of the society and not as representatives of their Russian state-related institutions, if they are not having like high ranked positions, for example. So, there are still contacts, and I know of a lot of contacts on the personal level. It includes private communication, but it also includes communication in the scientific context. For example, I know that lots of people are still jointly looking at data that were acquired before the beginning of the war, and that they are still partially continuing to analyze it and to publish it in scientific publications. But regulations are really different and some people are allowed to do so, some are not. It depends on the context, on the institution, and yeah, on the general framework where they are situated.

And in general, what would you say should we do, should maybe the international community do if the war continues for a long time and if there is no political change in Russia in the foreseeable future?

This is a really difficult question. I know that this is being discussed on all levels of the science community and the science organizations and the funding bodies and the ministries and I do not have a clear answer to that. So, everyone knows that science is international, that especially for topics which you cannot really address completely without Russia. And this includes, of course, the pressing topic of climate change, which is again really concentrated also on the Arctic. This is not possible without Russia, but how to move on in these regulations? For cooperation, which frameworks should there be, how this will be developing in the future, that is really not foreseeable at the moment and not easy to resolve .

The nuclear icebreaker "Arktika" in the Kara Sea. November 9, 1980.
Photo: Nikolay Zaitsev, RIA Novosti / commons.wikimedia.org
https://commons.wikimedia.org/wiki/File:RIAN_archive_186141_Nuclear_icebreaker_Arktika.jpg

Northern practical approach

How Russia's activity in the Arctic has changed since it invaded Ukraine in February 2022

BY EKATERINA MERMINSKAYA

During wartime, Russia has made the Arctic its priority, but not in the environmental sense. It is trying to accelerate development of the mining industry and infrastructural projects. But sanctions are hindering this.

Russia's state policy in the Arctic

The Arctic is one of the most important regions from the standpoint of climate change. As we know, the Arctic heats up twice as fast, and according to some assessments even four times faster, than the planet on average. And the melting icebergs cause an additional acceleration in global warming.

Russia has a decisive influence on the Arctic. The country controls 53% of the coastline of the Arctic Ocean, and Russian citizens make up half (2.6 million people) of all the people living on Arctic territories. For Russia itself, the Arctic occupies nine regions and almost one third (28%) of the area of the country. It also accounts for almost 10% of GDP, as 80% of Russian gas is produced in the Arctic, 17% of oil, almost 100% of diamonds, rare and rare-earth metals, 90% of nickel and cobalt, as well as around 60% of copper.

The Russian government probably sees the Arctic as a great strategic advantage rather than a responsibility. The local press seriously writes about the region as a military testing ground that needs to be fought for. At state level, the new edition of Russia's foreign policy concept devotes a separate chapter to the Arctic. The Kremlin states that it strives to reduce threats to "national security in the Arctic" and neutralize the policy of "hostile countries for militarization of the region". The concept has far less to say about the intention to ensure "ecological sustainability" (in fact, this is all it says) and the climate is not mentioned separately at all.

It should be noted that Russian officials mainly support the policy adopted earlier, and behave as if the country were included in the global climate agenda and shared the goals of sustainable development and energy transition. However, skeptical statements about the causes of global warming are increasingly heard. For example, speaking at the St. Petersburg International Economic Forum in 2023, executive director of Rosneft Igor Sechin announced that there was no scientific consensus on the nature, causes, speed and long-term direction of climate processes. The policy of the green transition, he believes, is based on "absolutization of the anthropogenic factor", which is not confirmed by objective scientific studies.

For example: "Today it is obvious that all the alarmist claims were exaggerated about how warming would lead to the disappearance of Arctic ecosystems, and that the human impact on the climate was irreparable," writes Russian Academy of Sciences corresponding member Arkady Tishkov in a column in the leading business publication Vedomosti. "The Arctic remains the Arctic, it will not go anywhere, just as it did not vanish in previous periods of warming on our planet."

It is increasingly difficult to influence Russia's actions. From the outside this is difficult as international cooperation has been suspended. Members of the Arctic Council and the Council of the Barents Sea / Euro-Arctic region froze interaction with Russia almost immediately after its attack on Ukraine. Denmark, Iceland, Canada, Norway, the USA, Finland and Sweden announced in the spring of 2022 that they would not take part in any events under the chairmanship of Russia (the country held the chair in the Arctic Council until May 2023, when it was replaced by Norway). Over 130 projects had to be suspended. "We cannot have the normal type of political interaction with Russia," Morten Høglund, Norway's senior Arctic official, told Politico in February 2023. "But we are hopeful that we will be able to find a way to get work going on a lower level, on the expert level, technical level, project level and so on." In response, Russia removed all mention of both organizations from the "Foundations of state policy in the Arctic until 2035".

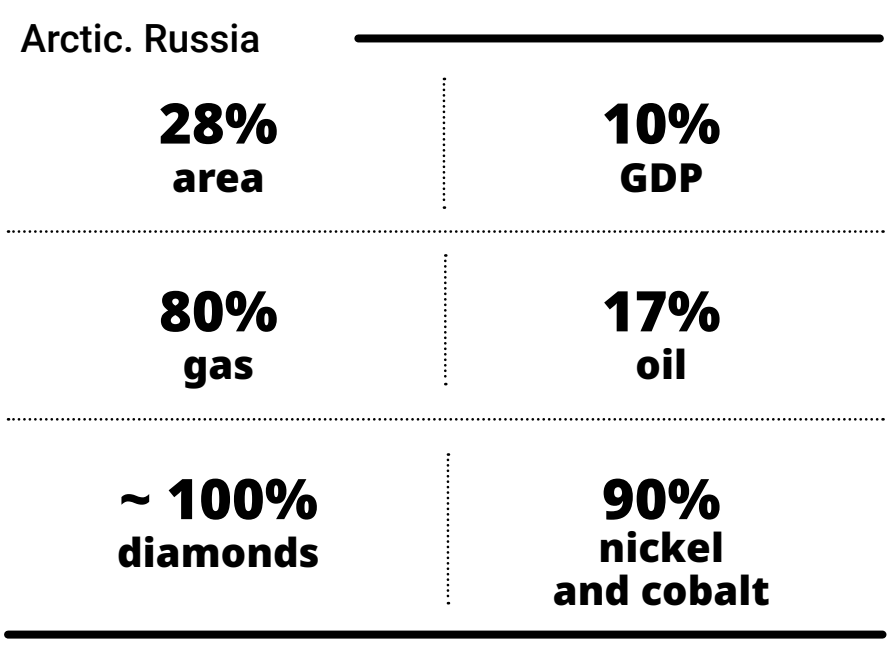
However, western countries are still looking for alternative paths of interaction for the sake of global goals. "We cannot wait for the political climate to be perfect and wait for Russia to be a different country. We need to find a mechanism to make this [the Arctic Council] work," said Hoglund. Russia intends to increase the influence of external regional actors in the Arctic. It has invited China, India, Brazil and South Africa (the BRICS countries) to join its research projects on the Spitzbergen Archipelago. It has already held joint coast guard training exercises with China.

There are also few opportunities to direct Arctic state policy from inside the country. Foreign environmental organizations such as GREENPEACE, WWF and BELLONA have been declared undesirable in Russia. Additionally, the general prosecutor's office charged GREENPEACE with attempting to hinder infrastructural and energy projects that were beneficial to the country. And it charged the WWF with conducting "activity directed towards hindering the country's policy for the industrial development of the Arctic", as well as taking part in "developing and legitimizing restrictions which could serve as grounds to shift the Northern Sea Route into the exclusive economic zone of the USA". Perhaps the authorities were thinking of the campaigns by GREENPEACE in 2012 and 2013 (criminal cases were opened), when activists attempted to occupy the "Prirazlomnaya" oil rig in the Arctic, to draw attention to the problem of pollution caused by mining companies in the region. And the fact that recently the WWF proposed to create a 12-mile buffer zone along the Arctic coastline of Chukotka. In March 2022, deputies of the Chukotka Duma demanded to suspend the activity of the WWF in the region after this initiative. This zone, they explained, affects defensive capability and economic security, and poses a threat to passage in the Northern Sea Route, to laying communications lines and the traditional economic activity of indigenous peoples. The WWF did not agree with these charges, but this did not help its case, just as it did not help GREENPEACE.

Russia itself intends to continue developing megaprojects in the Arctic. The war has not made these plans more moderate, and on the contrary the government is working on expanding the Northern Sea Route (both by the number of vessels and by port capacities). It also supports new projects for production of liquified natural gas (LNG), and intends to attract investments through privileges for a special economic zone, and through the special private investment fund Vostok (for hi-tech startups). State companies intend to keep investing in the region.

Rosneft's flagship project in the Arctic is Vostok Oil, which lays claim to the status of the largest investment project in the world oil and gas sector. It encompasses 52 licensed sites in the north of the Krasnoyarsk Krai and in the Yamalo-Nenets autonomous district, where 13 oil and gas fields are located. Vostok Oil unites Lodochny and Tagulsky fields and the already functioning Vankorsky and Paiyakhsky fields, and may provide production of up to 100 million tons of oil by 2030.

Before the war, there was discussion of plans to augment Vostok Oil with the Taymyr LNG plant, as well as to build the Kara LNG plant on Novaya Zemlya in 2030-2035. But nothing more has been heard of these plans since the war began. The company may receive the right for the independent export of LNG (the State Duma is examining amendments) from Vostok Oil and other fields – it has a total of 36 fields in the Arctic. None of these LNG projects are likely to be realized in the next 7-10 years, according to analyst



Yamal LNG
Photo: sever-press.ru / commons.wikimedia.org
https://commons.wikimedia.org/wiki/File:Yamalspg.jpg

at BKS Investment World Ronald Smith, "because of the lack of access to some of the technologies for gas liquification, and also the need to develop shelf fields".

Gasprom Neft has the "Prirazlomnaya" oil rig mentioned above. Its term of service is set to end in 2038. Before the war, Gazprom Neft was studying the possibility of extending its operation, but this has now ceased to be a topic of discussion.

Gazprom Neft also continues to develop the Novy port field and plans to produce 5.08 million tons in 2024. One of its most promising projects is considered to be "Yenisei", which proposes developing the Lesiknsky and Pukhutsyayakhsky sites on the Gydan peninsula.

For the future, the company also has a large-scale exploratory cluster of 29 sites in the Yamalo-Nenets autonomous district and the Krasnoyarsk Krai.

In December 2022, Gazprom itself opened the Semakovsky gas field in the Yamalo-Nenets autonomous district. Work should soon be completed at one of the major fields, Kharsaveisky, on the Yamal coastline. This is one of the three key fields, along with Bonavenkovsky and Kruzenshternsky. Together, they are the foundation for a new center of gas production which Gazprom has been working on over the past ten years. Gazprom plans that the total production here will be around 180 billion cubic meters of gas per year.

NOVATEK is a leader in the LNG sector in Russia, and continues to work in the Arctic. In 2022, its Yamal LNG project produced 21 million tons of liquified gas, of which over 16 million tons was sent to Europe. For transportation, it uses the Northern Sea Route. Tankers with gas from Yamal LNG "opened navigation on the Northern Sea Route, bound for Chinese terminals", and this year the first tankers were sent to Japan and Taiwan, according to a Rosatom representative.

In 2023 Novatek also put the new Arctic LNG-2 project into operation – the first liquification line was launched on a gravity-based structure, which is later planned to be towed from the NOVATEK-Murmansk offshore superfacility construction yard to the Utrenny field on the Gydan peninsula. Three gas liquefication lines are planned with a total capacity of 19.8 million tons per year. The first line is planned to be put into operation in late 2023-early 2024, the second in 2024 and the third in 2026. Japan has exempted the Arctic LNG-2 project from sanctions so that it can provide construction and engineering services without obstacles – the Japanese companies Mitsui and Jogmac own 10% in the Arctic LNG-2 project.

According to NOVATEK's forecast, by 2027 LNG production on Yamal and Gydan will reach a level of 44.2 million tons per year and exceed the capacity of sea transshipment terminals, requiring their expansion. Additionally, construction of LNG tankers, unlike the main project, suffers from sanctions and is proceeding more slowly.

Rosatom and the Northern Sea Route

Rosatom is responsible for the Northern Sea Route project. The route itself, the shortest between East Asia and Europe, has been operating since 1991. The distance from the Kara Strait to Provideniya Bay is around 5,600 kilometers, entirely situated in Russia's territorial waters. But at present navigation in the eastern sector in winter is impossible without icebreaker support, as the ice reaches a thickness of three meters. The NSR project plans to make navigation possible all year round by 2039. The road map of the project up until 2035 assesses the cost of construction at almost 1.8 trillion rubles.

It is planned for the NSR to provide export goods and transportation of natural resources (oil, LNG, coal, metals) to countries from the European part of Russia to Asian partners. The NSR will also assist in transporting goods to regions of the Far North

This primarily involves developing the ports of Sabetta, Dudinka, Khatanga, Tiksi and Pevek. For example, in Pevek it is planned to build additional cargo wharves and install floating nuclear power units. The government allocated 27.5 billion rubles to this project in the spring of 2023. It is planned to attract an equivalent sum from private investors. The overhauled Pevek port will dispatch up to 2 million of tons of metal from the Baimsky field.

Construction of ice-class vessels is also planned By 2024, regular deliveries should be ensured by three series 22220 icebreakers: "Arktika" (the head vessel), "Sibir" (first vessel) and "Ural" (second vessel). These vessels have been completed and currently operate on the Northern Sea Route. Another two are under construction – "Yakutiya" (third vessel), and "Chukotka" (fourth). By 2030 it is planned to build the fifth and sixth series 22220 icebreakers and four non-nuclear icebreakers. The development plan for the NSR infrastructure entails the construction of 37 vessels in total (eight icebreakers, 16 search-and-rescue vessels and 13 survey vessels).

However, global warming may simplify the task for the government. "The key climate change of the Arctic region which directly impacts socio-economic and political factors is the unprecedented growth in the accessibility of Arctic sea

routes. This is because first-year ice has become the dominant type of sea ice in the Arctic Ocean, and in the mid-21st century it is expected that there will be no ice cover at all during the summer months. For icebreakers of RS37 class, which may navigate through multi-year ice all year round, navigation will be accessible in 90% of the Arctic territory. For RS6 class vessels (navigation in first-year ice) by the middle of the century navigation all year round will be possible in 60% of Arctic territories," experts from the NGO Arctida write in the study "Key stakeholders of Russian Arctic policy".

Even without taking this effect into account, the amount of cargo is increasing exponentially. It came to approximately 34 million tons in 2022, with a plan for 36 million tons in 2023. But in 2024 this figure will rise to 80 million tons, to 150 million in 2030, and to 220 million tons in 2035. Also, 80% of Russian cargo will be LNG according to the plan.

But this is without taking sanctions into account. A risk scenario predicts that the flow of goods in 2024 will be lower than the planned figure – 57 million tons. This is mainly because of the decrease in the amount of transit cargo. "It is now open to question whether foreign companies wish to transport anything at all through Russian waters," commented the head of InfraOne Research Alexandra Galaktionova.

Rosatom is responsible not only for the Northern Sea Route, but also plans to build several small capacity nuclear power stations in the Arctic. Rosatom, or rather its First mining company, is also developing a Mining and Processing Plant (MPP) for the Pavlovsky field (zinc, lead and silver) on the southern island of Novaya Zemlya. Here sanctions have already had an effect – the company had to abandon the idea of building a floating MPP and return to more traditional solutions.

The major Baimsky MPP (12 perspective fields of copper, and also gold and silver at the porphyry copper site in the Bilibinsky region of the Chukotka autonomous district) is so far just a project. It is scheduled to receive power units by July 2031.

Arctic routes

Projects by residents of the Arctic Zone are on a smaller scale. They include gold mining by the Severnaya Territoriya company in the Komi Republic and by the Elgen company in Yakutia, as well as construction of a railway terminal in Arkhangelsk by the Polar Trans Port. company There are 637 residents, but only six of their projects have had subsidies approved for building infrastructure.

Sometimes state companies sponsor research projects. During the expedition of the Arctic Floating University in June 2023, for the first time scientists used drones to gather data about coastal litter on the archipelago of Novaya Zemlya in the Arctic Ocean. Previously, glaciologists and specialists on geoinformatics from the Institute of Geography of the Russian Academy of Sciences also used drones to observe the state of northern ecosystems.

Development of the Arctic zone is becoming especially important, Deputy Prime Minister Yury Trutnev said in July 2022: "There are at least two reasons for this. The first is the task set by the president to accelerate development of the Northern Sea Route. The shift of export potential from the West to the East led to a significant deficit of transportation capacities in the Eastern region. The Northern Sea Route will help to decrease the load in the Eastern region and divert some of the cargo from it, and thus ensure that the cargo arrives on time and sometimes more efficiently. The second reason is that the sanctions levelled by hostile countries caused a disruption to technological chains, with important links being lost in the construction of boats and planes, and delivery of mining equipment. In many ways, Russia's economic stability depends on how quickly and effectively we can compensate for these links and assemble technological chains once more". We should note that the word "stability" is clearly not being used here in the ESG sense.

All the projects involving the production and transportation of hydrocarbons are "above all one of the key factors of enormous ecological and technogenic risks" for the Arctic, say experts at Arctida. "One must take into account the fact that Arctic routes will be required primarily for transit goods," they warn. "In other words, transportation of oil products will predominate, which carries additional risks of environmental disasters in the case of an oil spill".

An oil spill – which did not even occur during transportation, but from a leakage of a stationary container at the Nornikel thermal power station – has already become the greatest environmental disaster in the Arctic to date. "The situation is complicated by the fact that unlike the Antarctic, transportation and the use of heavy fuel in Arctic waters are not prohibited by any international conventions," the Arctida experts write.

Additionally, even without oil spills and accidents, energy projects have a destructive impact on sea mammals, birds and fish, whose habitat is extremely localized and concentrated near areas where raw materials are produced during the warm time of year, the authors of the report note. They also note the negative impact of oxidation, i.e. the increased level of anthropogenic carbon dioxide gas in northern waters, which increases risks of a reduction in marine biodiversity.

HOW THE ARCTIC PRESENCE IS REGISTERED ON PAPER

The main tasks and goals that Russia sets itself in the Arctic are outlined in **"The Foundations of the state policy of the Russian Federation in the Arctic"** as well as in the **"Strategy of developing the Arctic Zone of the Russian Federation and ensuring national security".** A plan of realization is attached.

Additionally, there is the state program **"Socio-economic development of the Arctic".**

The Northern Sea Route: the Arctic on sale

The Russian government's pursuit of illusory big profits by intensifying shipping on the Northern Sea Route threatens to cause major environmental problems

BELLONA EXPERT GROUP

Russia intends to intensify the use of the Northern Sea Route (NSR). Plans made prior to the war were complicated by sanctions levied against Russia after its invasion of Ukraine, forcing Russia to refocus its export, shifting from western to Asian markets. This may also lead to greater use of the NSR and additional development of related infrastructure. At the same time, as the anthropogenic burden grows, environmental risks will inevitably increase, which are especially critical in the Far North.

Yesterday

It is believed that the idea to use the Northern Sea Route as a transport corridor between Europe and Asia was first proposed by the Russian diplomat Dmitry Gerasimov in 1525. However, the first time this route was successfully completed, entering the Pacific Ocean via the Bering Strait, was on an expedition in 1878-1879 by the Swedish explorer Baron Nils Nordenskiöld. In 1932, the "Alexander Sibiryakov" icebreaker was the first vessel in history to travel the entire northern sea route in one trip. This date is considered to mark the birth of the NSR. Its 90th anniversary was commemorated in Russia in 2022.

The first transportation of cargo took place in the period from 8 July to 9 October 1935, but it was not until the 1970s-1980s that the NSR began to be used actively. This was when the USSR began building its fleet of nuclear icebreakers, making Arctic navigation considerably more viable, and the Norilsk mining and metallurgical combine was put into operation, requiring year-round transportation of cargo on the Murmansk – Dudinka route.

Today

At present there are over 70 ports and shipping terminals located along the NSR. The largest are in Murmansk, Arkhangelsk, Naryan-Mar, Sabetta, Igarka, Dikson, Dudinka, Tiksi, Pevek and Provideniya Bay.

The main objectives of the NSR are the export of products manufactured in the Arctic zone of Russia and the servicing of related industrial facilities, use as an international transport corridor, as well as to cover part of the requirements of the Northern supply haul (deliveries of primary essential goods to the people of the Far North of Russia) and to provide for military needs.

The operator of the Northern Sea Route is the largest business structure in the Russian Arctic — the Rosatom state corporation. In 2008, Atomflot, which controls the nuclear icebreaker fleet, became part of Rosatom. In 2019, the Hydrographic Enterprise also joined Rosatom, and is responsible for navigation and hydrographic support of shipping, as well as the construction and operation of port infrastructure in the Northern Sea Route area. In 2022, Rosatom founded the federal state budget institute "Main Department of the Northern Sea Route", which accompanies vessels, establishes routes, and manages permits for shipping in the NSR area.

With the goal of developing the Northern Sea Route, an eponymous federal project — "Development of the Northern Sea Route" — is being undertaken. Its main objective is to increase cargo flow on the NSR to 80 million tons in 2024 and to 150 million tons in 2030, as well as to increase the

The cargo ship "Bering" and the icebreaker "Captain Chadayev," Arkhangelsk, April 2023.
https://www.shutterstock.com/ru/catalog/licenses

Volume of cargo transportation by the Northern sea route including transit cargo (thousand tons)

Source: https://ru.wikipedia.org/wiki/%D0%A1%D0%B5%D0%B2%D0%B5%D1%80%D0%BD%D1%8B%D0%B9_%D0%BC%D0%BE%D1%80%D1%81%D0%BA%D0%BE%D0%B9_%D0%BF%D1%83%D1%82%D1%8C

Cargo flow by the NSR in the period from 1 January to 15 December 2022

Cargo	Volume (thou. t)
LNG and gas condensate	20 489
Oil and oil products	7224
Coal	295
Ore concentrate	43.5
General cargo	4248

Source: https://rg.ru/2022/12/15/obem-perevozok-po-sevmorputi-v-2022-godu-prevysil-celevoj-pokazatel-zalozhennyj-v-nacproekte.html

total capacity of seaports to 110 million tons in 2024 and 2030 respectively. Rosatom is also responsible for realizing this project.

According to Rosatom data, in 2022 the volume of cargo transported by the NSR came to 34.034 million tons, 816,00 tons less than in 2021, owing to a 10-fold decrease in international transit (from 2 million tons in 2021 to 200,000 in 2022). This still made it possible to exceed the target figure (in the federal project) of 32 million tons of cargo in 2022.

The main cargo transporters include the projects "Yamal LNG" (main shareholder – PAO NOVATEK), the project "New Port" (the New Port oil and gas condensate field, Gazprom-Neft, and MMC Norilsk Nikel (ore concentrate).

Tomorrow

On 22 August 2022, the Russian government approved another important document, which was later revised on 28 April 2023, determining the future of the NSR, entitled the Development Plan for the Northern Sea Route in the period until 2035. It envisions an even greater increase in cargo flow compared with the federal project – up to 90 million tons in 2024 and up to 216.45 million tons in 2030. It is planned to allocate 1,790.5 billion rubles to realize the project. The document also lists the projects that will

SEA ROUTE ST. PETERSBURG – VLADIVOSTOK

14 280 km

The Northern Sea Route

23 200 km

Path through the Suez Canal

The Northern Sea Route is the shortest sea corridor between Europe and Asia. It passes through the seas of the Arctic Ocean, and has a length of around 5600 km. The NSR is almost twice as short as other sea routes from Europe to the Far East.

help to reach these figures. One of the main cargo transporters remains Yamal LNG, which will provide a cargo flow of 19.5-20 million tons per year from 2023 to 2035. According to information from the Tyumen customs office, in 2023 10.5 million tons of LNG and gas condensate had already been dispatched for export.

In 2023, it is planned to send the first 3.6 million tons from Arctic LSG 2, located in the Yamal-Nenets Autonomous District, and in 2024 the volume of cargo should come to 12.6 tons per year. The main share in the project is also owned by NOVATEK. In 2024, the first cargo shipment is planned to be dispatched from another project in the YNAD, the Ob MCC, which produces ammonia and hydrogen. In the first year, production volume should reach 0.6 million tons. However, the co-owner and chairman of the board of directors of NOVATEK Leonid Mikhelson announced late last year that the project might be postponed because of pressure from sanctions.

In 2022, the Syradasai coal field began operating on Taimyr, owned by Severnaya Zvezda. It is planned that in 2024 it will supply 3.5 million tons of production, and by 2029 it will reach a capacity of 12 million tons, which will continue in the following years. However, the largest growth in cargo flow may be provided by the Rosneft mega project – Vostok Oil (Taymyr, Krasnoyarsk Krai). The project may start dispatching oil in 2024, with a volume of 30 million tons planned in the first year. This is just 4 million tons less than the total volume of cargo on the NSR in 2022.

Rosneft began to realize the project in 2020. By 2030, after the completion of the second and third phases of construction, it is planned to increase the volume of oil shipment up to 100 million tons. For comparison, the total export of Russian oil in 2022, according to information from Russian deputy prime minister Alexander Novak, came to 242 million tons. Furthermore, from 2027 "Arctic LNG 1" (Novatek, YNAD) and the Baimskaya copper and gold field (Baimskaya mining company, Chukotka autonomous district) will start operating.

The document also plans the development of a comprehensive plan to create the Kyuchussky cluster of fields of solid minerals in the Republic of Sakha (Yakutia), and also to prepare and approve a licensing program up until 2035 for other fields of the Arctic zone, with a resource base that may potentially provide a full load for the Northern Sea Route. Other major sources of cargo flow may include the Northern supply haul, transit and cargo for servicing industrial facilities. In 2024, according to the plan, the total flow will come to 16.78 million tons, and in 2035 to 53.58 million tons.

It is planned to send coal from Kuzbass and Khakassia, which will be loaded in Krasnoyarsk and Lesosibirsk from railroad to river transport, transported by the Yenisei to Dudinka, and then sent to Asia, deputy prime minister Yury Trutnev announced in February. A test run for sending coal from Kuzbass to China by this route should take place this year, and the volume of the shipment will come to 30,000 tons. It is also planned to send sawn wood products and grain by this route.

How

Infrastructure

To realize these goals and intensify coastal and international shipping, the NSR port infrastructure will be developed. The federal project "Development of the Northern Sea Route" plans the construction of terminals for liquified natural gas and gas condensate, "Utrenny" and "Obsky" in Sabetta seaport (YNAD), a marine oil terminal in Sever Bay (Yenisei gulf, Taymyr, Krasnoyarsk Krai) and a marine coal terminal at the base of the Syradasai coal field in Dikson seaport.

The plan for developing the NSR up until 2035 contains 16 projects to build port facilities and their accompanying land transport infrastructure. Besides the above-listed projects, the document also discusses construction of a transport and logistics hub in the Korsakov seaport on Sakhalin, which although it is not located on the NSR, is an important point connecting the NSR with markets of Asian countries. Other projects include developing the Murmansk and Arkhangelsk transport hubs, and building bunkering and technical service bases in the ports of Tiksi and Dikson.

Since 2020, work has been proceeding on reconstructing the Sea Channel, a shipping channel in the Ob Bay of the Kara Sea, which also involves dredging operations. Dredging operations are planned in other sections of the NSR, along with the creation of a single operator which will carry out this activity.

Of the land projects for developing accompanying transport corridors, the largest is the Northern wide rail "Obskaya – Salekhard – Nadym – Pangody – Novy Urengoi – Korotchaevo" with a length of 707 km. The route passes through oil fields, including fields of the Vostok Oil project, and will also make it possible to connect a number of projects on the NSR to one another and to the country's railroad network.

Neither the federal project nor the development plan for the NSR until 2035 mentions construction of additional ship-repair facilities on the NSR. However, at the Petersburg international economic forum held on 14-17 June 2023, an agreement was signed on construction of a ship-repair yard in Arkhangelsk capable of servicing up to 40% of the Arctic fleet. The schedule for its operation is not yet known. It is also planned to create a

ship-repair cluster in Murmansk on the basis of existing facilities, according to Alexander Amirov, Deputy Minister of natural resources, ecology and fishing for the Murmansk Oblast.

International sanctions have changed the situation of insuring vessels, primarily oil tankers that transport oil produced in the Russian Arctic for export. Most tankers are now insured by Russian companies which offer significantly lower coverage sums than western insurers. In the case of accidents, these sums may not be sufficient to cover all the costs to eliminate the consequences for the environment.

The fleet

"Seventy-five to eighty ice class vessels and icebreakers – this is the required number forecast for 2035 to ensure reliable shipping on the Northern Sea Route," says Rosatom director Aleksey Likhachev. "We assume that there will be 14 icebreakers by 2030. In the coming years, besides icebreakers we will need dozens of high Arctic class vessels. They will include tankers, bulkers, equipment vessels, container carriers and the port fleet. We see great prospects in the creation of the nuclear power flee," Likhachev said on 14 June 2023 at the PIEF.

The Russian Deputy Minister for industry and trade, Viktor Yevtukhov, announced the need for 70 vessels for transporting hydrocarbons alone. Twenty-six ice-class tankers for this purpose are already under construction at the Zvezda shipbuilding complex in the Primorsky Krai, and another 44 have been announced, said Yevtukhov.

An emergency rescue fleet of 46 vessels is planned for construction, and Arctic emergency rescue centers of the Emergency Situations Ministry will be equipped with helicopters. It is planned to create an Arctic satellite fleet to provide hydrometeorological and navigation support for shipping and to assess climate change, as well as the NSR digital ecosystem, which will provide real-time monitoring of movement of cargo and set routes in the constantly changing ice conditions with high accuracy.

Nevertheless, there is some doubt as to whether all of the declared plans can be realized. The 2019 Strategy for developing the shipbuilding industry of Russia until 2035 stated that share of foreign components in the total production cost of Russian ship-building in the civil sector was from 40 to 85%.was from 40 to 85%.

Amid sanctions, this has led to an increase in the cost of building ships and delays in the schedule for their completion, as well as worsening financial and economic indicators for wharfs. The schedule for completing the chief gas tanker Arc7 for Arctic LNG 2, built at the Zvezda complex, has been postponed from March 2023 by at least a year, according to Kommersant newspaper. This is also caused by difficulties in purchasing ship equipment after South Korea and other partners backed out of cooperation.

Additionally, it is planned to expand the timeframe of navigation. By decree of the federal tariff service, the schedule of summer and autumn navigation on the NSR is established to continue from 1 July to 30 November. However, early next year NOVATEK and Rosatom plan to launch regular year-round navigation in the eastern section of the NSR, according to Rosatom's special representative on issues of development of the Arctic Vladimir Panov. In February 2023 Rosatom presented a federal project for year-round shipping throughout the NSR, which is now in the stage of approval by the government.

Why

Export

As the head of the Ministry for Eastern Development Alexei Chekunov says, at present Russia accounts for over 70% of all economic activity in the Arctic. At the same time, according to data from the Higher School of Economics, in the Arctic section of the Russian Federation 80% of Russian natural gas is produced, 17% of oil, 90% of nickel and cobalt, 60% of copper and almost 100% of diamonds, rare and rare earth metals, with the region accounting for 10% of Russian GDP and 20% of all export from Russia.

Since Russia's invasion of Ukraine, a considerable number of foreign partners have begun to suspend cooperation with the aggressor country. This decision has also influenced the operation of the NSR – international transit and foreign export using it has decreased.

Nevertheless, in the Russian Arctic an exponential increase of production of minerals and an according increase in their export is planned. In a situation when many former areas of export have become inaccessible, Russia is expanding cooperation with its remaining partners while looking for new ones.

The Foreign policy concept of the Russian Federation, approved on 31 March, states that all countries are invited to develop the NSR which pursue a "constructive policy towards the Russian Federation", i.e. are prepared to shut their eyes to Russia's violation of international law, including war crimes in Ukraine. China and India are named as "key partners" in this document. They are also Russia's main partners in the Arctic.

Both countries have been declaring their ambitions in the Arctic for several years now and are attempting to consolidate their influence in the region. In 2018 China published a White paper on state policy in the Arctic, proclaiming itself to be a "Near-Arctic State". India passed its own Arctic strategy in 2022. Russia increasingly assists in furthering the interests of both nations in the region.

"India is now becoming one of the largest consumers of energy resources from Russia, and in future may become a serious purchaser of goods which are produced in our part of the Arctic – LNG, oil and concentrate," said Alexei Chekunov.

In 2022, China became the largest importer of Russian LNG, and in the first half of 2023 China increased import of LNG from Russia by 66% on an annual basis to approximately 3.9 million tons, according to calculations by Energy Intelligence based on data from Chinese customs offices.

As the deputy chairman of the Russian government Alexander Novak says, in 2022 "over 20 applications from different countries were received, primarily in Asia, for deliveries of oil, oil products and LNG".

Furthermore, the presence of foreign capital is observed in the most resource-intense projects on the NSR. NOVATEK owns a 50.1% share in Yamal LNG. Another 20% are owned by the French company Total, 20% by China Natural Petroleum Company (CNPC), and the remaining 9.9% by the Chinese Silk Road Foundation. A similar situation is seen with Arctic LNG 2. NOVATEK owns 60%, and share packages of 10% are owned by Total, CNPC, as well as China National

Climate risks resulting from burning fossil fuels are inevitable in shipping – primarily due to the use of heavy fuel on ships.

https://www.shutterstock.com/ru/image-photo/icebreaker-foggy-ice-canal-escorting-lng-1304202913

Offshore Oil Corporation (CNOOC) and Japan Arctic LNG (a consortium of Mitsui & Co. and JOGMEC)

Since 2016, Indian companies have owned a 49% share in Vankorneft, the operator of the Vankorsky field in the Krasnoyarsk Krai. Vietnam's participation in developing the North Purovsky gas condensate field in the YNAD is under discussion, as well as Thailand's possible participation in projects for hydrocarbon production, including LNG.

Transit

Xi Jinping raised the issue of expanding transit by the NSR at a meeting with Vladimir Putin last spring. After their talks, the Russian president announced that, in the near future, a joint work body would be created for both nations to develop the route. One of the reasons why China is interested in the NSR is that it wishes to reduce its dependence on the Suez Canal, and on the Strait of Malacca, Asia's main sea transport corridor that is located at the eastern end of this route. Blocking this corridor may hinder 90% of all Chinese trade and 80% of crude oil import.

India also plans to reduce dependence on the transport corridor it now uses and is examining the possibility of creating a container line on the NSR.

Another country interested in transport use of the NSR is the United Arab Emirates. An according agreement was signed between Rosatom and one of the largest world port operators, Dubai Port World.

Environmental risks

Projects

According to information from the Intergovernmental Panel for Climate Change (IPCC), 45% of oil and gas fields in the Russian Arctic are located in zones with a high risk of permafrost thaw.

It is hard to imagine the consequences that infrastructural damage may have, for example at Vostok Oil with its unprecedented production volume, which is owned by Rosneft, a company which according to data from Greenpeace holds the record for the number of oil spills in Russia (4253 spills at pipelines in 2018). At the same time, according to Nikolai Borisov, chief of staff of the head of the Emergency Situations Ministry, around 20% of accidents that have taken place in the last five years in the Russian Arctic region are related to oil and oil product spills.

Of the projects listed in the development plan for the NSR until 2035, industrial facilities which negatively impact on the environment and are ranked in the first (highest) danger category include the

New Port oil and gas condensate field and the Polar branch of Norilsk Nickel – which has caused damage to 16,581 hectares of land.

Another client of the NSR is the Syradasai coal field, where coal is extracted from an open pit, which disturbs the natural soil cover and forms piles of processed rocks, and as the coal is loaded in the open air, this causes dust pollution and pollution of water reservoirs.

Coal dust is also a climate factor that causes global warming. It absorbs heat, and when it settles on snow and ice, according to studies by the American Geographic Society, it reduces their reflective ability by 84%, leading to the ocean and soil to absorb greater solar radiation and warmth.

Shipping

Climate risks caused by fossil fuel combustion are also inevitable in shipping – primarily because of the use of heavy fuel oil (HFO) in vessels. This causes emissions of greenhouse gases and black carbon, which also impact climate change, and pollution of the air and water with sulfur dioxides and other toxicants. The shipping industry accounts for 2-3% of global emissions of CO_2; this figure may increase to 17% by 2050.

The total volume of CO_2; emissions from shipping in the Arctic came to 2.8 million tons in 2019, of which 28% was accounted for by tankers carrying natural gas (in 2019 there were just 24 of these tankers).

The sanctions of 2014 also caused the Russian arctic fleet to reject replacing heavy fuel oil with a more environmental form of fuel – gas. The tougher sanctions of 2022 make this prospect even more remote. In 2022, Russia refused to join the ban on using and transporting HFO as fuel in Arctic water, which will come into effect with a number of exceptions in 2024 and enter into full force in 2029.

The ban on HFO will help to reduce black coal emissions in shipping by 44% according to the Clean Arctic Alliance, made up of 22 non-commercial organizations including Bellona, which support a ban on using bunker oil fuel (a mixture of viscous and dark oil products – the remains of the process of distilling unpurified oil). To fulfill the goals of the Paris agreement, by 2030 the impact of shipping on the climate should be halved, and full decarbonization of the sector should take place before 2040, says Dr. Sian Prior, lead advisor to the alliance.

However, even if this ban is enforced a growth in cargo turnover will inevitably lead to increased risks of environmental pollution. There are regular spills in bunkering (refueling) vessels, in loading and storing fuel, and there are also spills caused by accidents while vessels are underway. Even in lower latitudes, cleaning up such accidents is difficult and requires enormous resources. In the Arctic region the response to these accidents is complicated by the severe climate, the ice conditions, the high sensitivity of Arctic nature to human impact, the lack of necessary infrastructure and the lack of experience in cleaning up accidents in these conditions.

Additionally, Russia's international isolation means that actions to clean up accidents in the Arctic may be poorly coordinated between countries, which will cause even more harm.

Other less obvious risks associated with intensified shipping in Arctic waters include noise pollution, introduction of invasive species, formation of artificial ice holes (which may cause whales to be trapped in ice and disrupt the migratory routes of land mammals), as well as risks relating to the operation of port infrastructure, unloading cargo in unequipped coastal areas and an increase tourism in the NRS area (including cruise tourism).

Conclusions

It remains to be seen whether Russian will be able to meet all the planned figures for production and export of raw materials in the face of growing pressure from sanctions. At the same time, the interest in Russian resources shown by China and India at the very least, as well as the participation by a number of companies in resource projects in the Russian Arctic zone, including companies from countries that have joined in the sanctions against Russia, allow us to assume that the resource development of the Russian Arctic will continue. However, there are no reasons to believe that Russia will respond adequately to the environmental risks caused by this development.

The main idea on which Russian Arctic policy is built is set out succinctly in the Program of the Chairmanship of the Russian Federation on the Arctic Council in 2021-2023, which served as Russia's guidelines during its chairmanship in this international body. The document states that the socio-economic dimension of cooperation in the council "is evidently inferior to the environmental dimension", and that Russia intends to "take steps to form a more balanced contribution of the council to addressing the challenges of sustainable development in the Arctic". This practically means reducing attention to issues of environmental protection.

The main documents regulating Russian policy in the region state that one of Russia's key interests in the Arctic is developing its resource potential. These are the "Socio-economic developing of the Arctic zone of the Russian Federation", the Foundations of state policy of the Russian Federation for the period until 2035, and the Strategy for developing the Arctic zone and ensuring national security in the period until 2035.

At the same time, Russian officials continue to talk of the positive aspects of climate change in the region, as this benefits navigation and interaction with other countries, and also raises efficiency in mineral production.

To make matter worse, in the Russian Arctic region, there is practically no independent supervision of industrial activity: business here is highly consolidated and directly controlled by the state, and scientific and expert organizations have practically no opportunity to make independent assessments, and are only needed for confirming decisions issued from above. These were the conclusions drawn by the Arctida environmental organization in its May report "Key Stakeholders of the Russian Arctic Politics" .

The Arctic is one of the key balancing forces that influences the Earth's climate system. It is in the Arctic that climate changes are more noticeable –warming occurs up to four times more swiftly than on average for the planet, studies have shown. For this reason, the region deserves especially careful treatment.

"It has long been recognized that what happens in the Arctic, doesn't stay in the Arctic, and will have repercussions elsewhere through sea level rise and changing weather patterns," Dr. Sian Prior warns.

The nuclear legacy of the arctic:

cleaning it up without international assistance will be tough

Why Russia will find it extremely difficult to solve the problem of accumulated environmental damage in the Arctic region on its own

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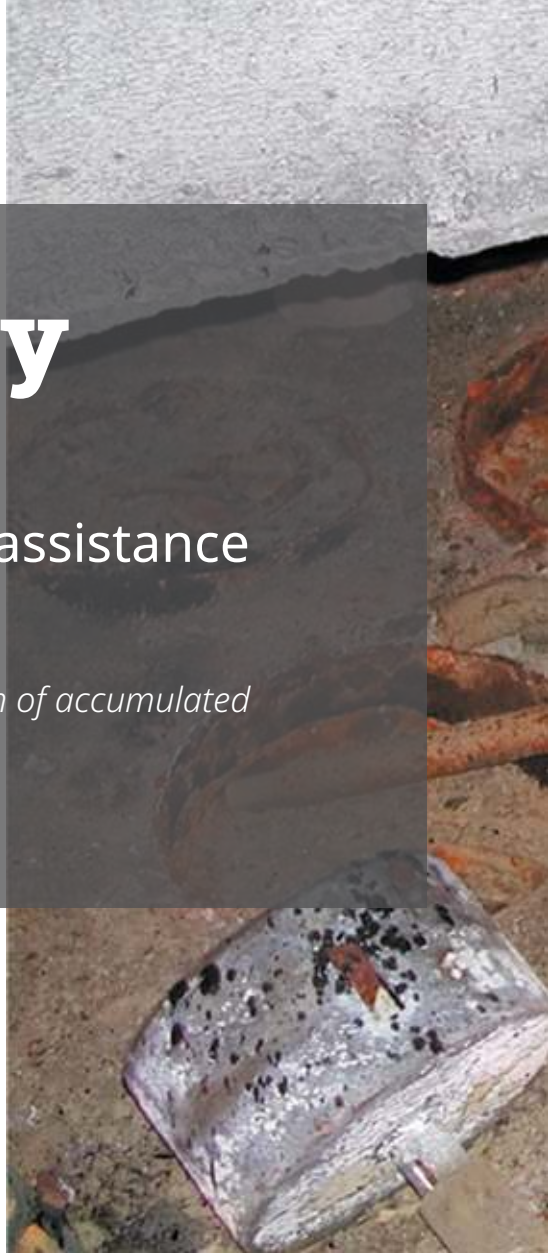


Over the past decades, up until 2022, thanks to the efforts of many countries, assistance from business and public monitoring, problems of pollution in the Arctic region gradually began to be solved. But Russia's war in Ukraine changed many things, including the conditions, scale and intensity of projects to clean up the nuclear legacy of the Soviet Union in the Arctic.

After the end of the cold war and collapse of the USSR, the international community and Russia initiated dozens of projects to clear the Arctic seas and coastline of nuclear and radioactive waste. Other countries concerned with the environmental situation in the Arctic region also took part in these projects.

Since the beginning of the war in Ukraine, all international companies and nations have backed out of joint projects with Russia and ceased financing, and have also suspended technological, political, public and other participation. Russia in its turn has taken a number of steps in domestic policy and made several grandiose claims that all projects to clean the Arctic will be continued, and that Rosatom will deal with these issues.

The Soviet legacy in the Arctic in early 2022

The Soviet Union left behind a mass of global nuclear problems in the Arctic region, where the main bases of the military and civic nuclear fleet of the USSR were concentrated, along with the main testing grounds for new weapons, including a testing ground on Novaya Zemlya. In the late 1990s, when information about Soviet nuclear projects became available, it became clear that no country in the world had so many old nuclear submarines and vessels, or nuclear and radioactive waste dumped on the coastline or in the sea, as Russia did in its Arctic region. Bellona has written about this in detail in numerous reports and publications.

https://network.bellona.org/content/uploads/sites/4/2015/07/fil_arktika.pdf

https://network.bellona.org/content/uploads/sites/4/2021/02/2020_20_ARCTIC_10.pdf

At present it makes sense to analyze what remains of the nuclear legacy since the outbreak of the war that caused all international organizations to suspend their participation in projects, as well as to assess the prospects of the further clean-up of the Arctic region.

It should be noted that in the 20 years prior to the war (from 2001 to 2021), a large amount of radioactive and nuclear waste accumulated on the Kola peninsula and Arkhangelsk Oblast was localized.

During this period, with the active participation of other countries a site was built for reactor compartments and a center for processing radioactive waste in Saida Bay. Conditions were created for decommissioning a problematic spent nuclear fuel storage facility in Andreeva Bay, the former nuclear submarine base Gremikha was partially cleaned up, and a number of other significant projects were realized. Nevertheless, today the nuclear legacy in Andreeva Bay and Gremikha has not yet been entirely eliminated – the former Soviet nuclear submarine base remains, and radioactive materials

Cells of a dry spent fuel storage facility in Andreeva Bay, 2001. Photo from the Bellona archive.

submerged and sunk in the Arctic seas have not been raised. There are also problems with processing and storing of radioactive waste in Saida Bay, and on the territories of Atomflot and bases of nuclear vessels.

Pre-war progress in Andreeva Bay

Eliminating the nuclear legacy at the 569th coastal maintenance base of the Northern fleet in Andreeva Bay, located on the Murmansk coast of the Barents Sea, is assessed as the most complex project on the Kola peninsula – the most problematic (even by world assessments) large emergency storage facility of spent nuclear fuel is located on this territory.

The SNF emergency storage facility, which originally contained 22,000 spent fuel assembly elements (SFA) from 100 nuclear reactors of submarines and icebreakers, was established in 1983. Bellona has described in detail the history and main stages of building the dry cask storage facility in reports, and also in the book "The Nuclear Andreeva Bay".

https://network.bellona.org/content/uploads/sites/4/2020/12/GA_DEC_2019.pdf

https://network.bellona.org/content/uploads/sites/4/2015/07/fil_book_nikitin02.pdf

Besides SNF, 18,600 cubic meters of solid radioactive waste is stored in the open air in Andreeva Bay. The total activity of the entire nuclear legacy of Andreeva Bay is assessed by experts at 3.6 million Curies (for comparison: the total emission of radioactive materials into the environment in the Chernobyl disaster was around 380 million Curies).

From 1998 to 2001, the 569th coastal maintenance base of the Northern fleet was transferred by the military to Rosatom, the civil federal agency for nuclear energy (at that time known as the Russian Ministry for Nuclear Energy). This is thought to mark the moment when projects began to be realized for eliminating the nuclear legacy with the participation of the international community. In the period of 2000-2022 a technological complex was equipped for treating SNF, a complex for treating and eliminating radioactive waste, and also sites for providing radiation, fire and physical safety. Norway, Sweden, the UK and Italy, as well as institutions, organizations and banks of the European Union participated in building these complexes.

In late 2021 56% of SNF (12 055 SFAs) were loaded and transported to

Dry storage units in Andreeva Bay, 2014. Photo from the Bellona archive.

Infrastructure units built in Andreeva Bay with the help of international donors, 2014. Photo from the Bellona archive.

the Mayak production association from Andreeva Bay, and approximately 9945 SFAs remained, which are mainly held in the dry storage container 3-A and are the most problematic – their transportation requires special solutions, as there are many defective SFAs among them. It is probably not possible at present to forecast how quickly and safely Rosatom will be able to cope with this task. According to the plan that existed before the war, loading and removal of SNF from Andreeva Bay was to be completed in 2028, but events took a different course, and international financing and technologies were withdrawn from Russia. According to reports, in 2022 two batches of SNF were transported from the dry storage container to Mayak. From 2017 a total of 18 batches with spent nuclear fuel were dispatched to Mayak.

As for solid radioactive waste, including waste in polluted buildings, around 9,500 cubic meters of it remained as of late 2022 in Andreeva Bay, i.e. 51% of the volume of the Soviet legacy. It would seem that there should be fewer problems with the removal of this waste than with removal of SNF, as solid waste is moved to a nearby location and according to an established procedure, mainly to Saida Bay – for treatment and further storage. Initially it was planned that all the accumulated and newly formed solid waste would be removed by 2026, but it is now clear that these plans are not feasible. About 50% of the contaminated radioactive buildings and other sites remain to be rehabilitated or dismantled, for example the dry storage container, after SNF is removed from them. The schedule for removing SNF from the dry storage container has been postponed to 2030 or later, as financing and other necessary resources have dwindled considerably since the war began.

Bellona has written about the problematic site that remains in Andreeva Bay and for which there is no ultimate plan or targeted actions, the former wet hazardous storage facility (pool) for SNF (building 5).

https://network.bellona.org/content/uploads/sites/4/2017/12/BIL_5.pdf

At present, only inspection of this building is being carried out, and projects of decommissioning the site are under discussion. Even after SNF is removed from it, the building is a radioactive site which cannot realistically be cleaned of high radioactive pollution. According to expert assessments, decommissioning building 5 may cause around 15,300 tons of waste to form, of which 32% is medium-level radioactive waste, 22% is low-level radioactive waste, 8% is very low-level radioactive waste and 38% is industrial waste. Two options for liquidating this site are under discussion: complete demolition, and removing the rubble and litter and placing it in radioactive storage facilities, or placing a sarcophagus over the building.

The unsolved problems of Saida Bay

In Saida Bay on the coast of the Kola gulf, a center for conditioning and long-term storage of radioactive waste was established. Initially, primarily with the financial support of Germany, a long-term storage point was built for reactor sections from scrapped nuclear submarines, which Bellona has also written about.

https://network.bellona.org/content/uploads/sites/4/2015/07/sevflot.pdf

The projected capacity of the point provides for the storage of 150 blocks of nuclear submarines, 12 blocks of floating maintenance bases, and 3 units of surface vessels. As of late 2022, the center in Saida Bay had 123 blocks of nuclear submarine reactor compartments, 10 container blocks of service maintenance vessels and 3 container blocks of the nuclear icebreakers Sibir and Arktika. At present the long-term storage site in Saida is 80% full. The power of the gamma radiation

Storage area for reactor compartments in Saida Guba, 2017. Photo from the Bellona archive.

dose at a distance of one meter from an object stored at the site does not exceed 50 μSv/hr, (for comparison: the radiation level considered safe for human beings is 0.2 μSv/hr).

The storage period of these sites is 70 years. At the end of the storage period, the main radionuclides break down and the high alloyed steel from which the reactor sections are made becomes safe, so it may be used for any other purposes.

Another problem that also affects the enterprises at Saida is the lack of a radioactive waste burial point. Most historical and non-historical radioactive waste from facilities located on the Arctic coastline is taken to Saida, where it is stored. But the question remains – what should then be done with this radioactive waste? In the Northwest federal district, there is no long-term radioactive waste burial point, which according to the law "On treatment of radioactive waste" should contain radioactive waste of the 2nd, 3rd and lower class of hazard. So part of the radioactive waste from the Kola peninsula is at present transported to other regions. For example, radioactive waste from Atomflot is transported to Sergiev Posad in the Moscow Oblast, which naturally causes concern in the local administration, and especially in the community. The intensive transportation of radioactive waste and SNF which is observed in the Arctic regions has not yet led to any hazardous nuclear radiation incidents, but there is a first time for everything.

Therefore, it is obvious that there is a need to take preventative measures to reduce the number of possible incidents – i.e. establish radioactive waste burial sites in regions where radioactive waste forms. Bellona has written about the special features of transporting radioactive materials in numerous publications.

https://network.bellona.org/content/uploads/sites/4/2016/01/Doklad_po_transportirovke_RM_sm.pdf

Rehabilitation of the Gremikha coastal maintenance base

The 574th coastal maintenance base of the Northern fleet Gremikha is located on the coastline of the Barents Sea near the Jokangsky islands to the west of Svatyoi Nos cape. In reports and articles, Bellona has written about the problems and features of with this remote base.

https://bellona.ru/publication/arktika/

In the Soviet period, at the Gremikha base SNF was stored from reactors of nuclear submarines. This is the only place in Russia where SNF from reactors is stored in which a liquid metal heat conductor (Pl-Bi) was used. After the Gremikha base was transferred to Rosatom in 2000.

https://network.bellona.org/content/uploads/sites/4/2021/02/2020_20_ARCTIC_10.pdf

The ship "Lepse", a floating technical base, on the shipyard slipway plate, 2014. Photo from the Bellona archive.

116 containers of SNF and solid radioactive waste were left at the base, with a gamma background equal to around 3.2 microSv/hr. Additionally, the water area and territory were polluted through atmospheric precipitation, as the site was not protected. In 2005, with the financial support of France, a shore complex at Gremikha was created for loading treated removable parts from reactors with liquid metal heat conductors. In the period from 2012 to 2022, eight parts from reactors with liquid metal heat conductors were dismantled and sent to Dmitrovgrad for treatment. Another three parts remain to be dismantled and dispatched, and problems with high-level radioactive and medium-level radioactive solid (metallic) waste must be solved, where robotics are required for treatment. It is planned that in 2023-2027 works will be carried out to move accumulated high-level radioactive waste to storage and treatment in Said Bay.

Atomflot – a decommissioning process of many years

The federal state unitary enterprise Atomflot began functioning in 1988 and at present carries out the operation, servicing and scrapping of nuclear icebreakers and technical service vessels. The Atomflot industrial site is located on the eastern shore of the Kola Gulf, at the outlet from its southern bend. The territory of the enterprise occupies the coastal waters of the gulf, the lower sea terrace and part of the slope next to the gulf. Vessels are based in Atomflot's waters which may pose nuclear and radioactive hazards:

– eight vessels with nuclear power systems (the nuclear icebreaker Sibir, Arktika, Ural, 50 let Pobedy, Yamal, Vaigach, Taymyr, the nuclear light carrier Sevmorput);

– vessels with nuclear reactors moved to the category of "radiation source" (the nuclear icebreakers Sovetsky Soyuz, Rossiya, Lenin);

– vessels of nuclear maintenance service (the floating maintenance bases Imandra and Lotta, the tankers Serebryanka and Rossita).

Additionally, the enterprise has nuclear and radiation hazardous objects on the coastline;

– storage facility of treated nuclear fuel of container type of the icebreaker fleet;

– shore loading post which is designed for loading shells with spent nuclear fuel into transport containers;

– accumulative site for temporary storage of transport containers with spent nuclear fuel from the navy. From the site it is loaded into a wagon container train which takes the SNF to treatment at the Mayak production association;

– liquid radioactive waste storage facility;

– solid radioactive waste storage facility;

– temporary storage facility of conditioned radioactive waste.

Work on eliminating the nuclear legacy mainly concerns decommissioning nuclear icebreakers and nuclear service vessels that have completed their term of service. Work on scrapping the Artika icebreaker began in 2016 and is still continuing. It is planned to start work on scrapping the Rossiya and Sovetsky Soyuz icebreakers in 2027.

It is true to say that scrapping of the Lepse floating technical base is a project which was prepared and realized thanks to the considerable efforts and activity of Bellona. Bellona always kept a constant watch on the Lepse base.

https://network.bellona.org/content/uploads/sites/4/2022/02/2021_LEPSE_03.pdf

In 2021, scrapping of the vessel itself was completed, but the problem of loading 18 defective SFA from caissons of the storage facility has not yet been fully solved. There may be mechanically damaged SFA or assemblies with defective nuclear fuel shells. As a rule, they cannot be placed in standard containers for transportation, and so it is probably impossible to use technologies for processing non-defective SFA. According to plan, the container block of the Lepse floating base should be installed on the site in Saida Bay in 2023, and defective fuel should be put in long-term storage in the Atomflot storage facility. At present work is being carried out to transport it to the Nerpa ship-repair center.

Problems of storing radioactive waste at ship-building and ship-repair centers

Four centers are located on the Arctic coastline which carry out the construction, repair, decommissioning and dismantling of nuclear vessels of various purposes belonging to Atomflot and the Russian navy.

Two centers (the NSR and Zvezdochka ship-building centers) are located in Severodvinsk and two (the Nerpa ship-repair center and the 35th ship-repair center) on the Kola peninsula. Nuclear and hazardous radioactive activity at these centers dates from the time when the Soviet Union began building nuclear vessels, so it is quite appropriate that the nuclear legacy there mainly accumulated in the form of old storage facilities of liquid and solid radioactive waste. As a rule, nuclear waste at these centers is only suitable for short-term storage, so there are no storage facilities like the ones in Andreeva Bay or Gremikha. For a long time, there was no storage facility for solid radioactive waste in Severodvinsk that complied with modern safety requirements. Bellona has written reports about the major problems of storage at ship-repair centers, devoting particular attention to problems in Severodvinsk.

https://bellona.ru/publication/nothernfleet/

At present, the Severodvinsk ship-building center Zvezdochka has completed construction of the complex for treating radioactive waste.

https://tv29.ru/new/index.php/bk-obshchestvo/37166-severodvinskaya-zvezdochka-zavershila-rekonstruktsiyu-kompleksa-dlya-obrashcheniya-s-nakoplennymi-radioaktivnymi-otkhodami?utm_source=yxnews&utm_medium=desktop

Sunk and submerged objects – the main source of radioactive pollution

Submerged and sunken nuclear and radioactive objects currently pose the greatest problem in clearing the Arctic of the Soviet nuclear legacy. The scale of the problem is discussed in many materials, from "The White Book" by Alexei Yablokov (1993) to publications that provide precise data on technogenic radionuclides in the Arctic seas.

http://elib.biblioatom.ru/text/tehnogennye-radionuklidy-v-moryah-omyvayuschih-rossiyu_2005/go,0/

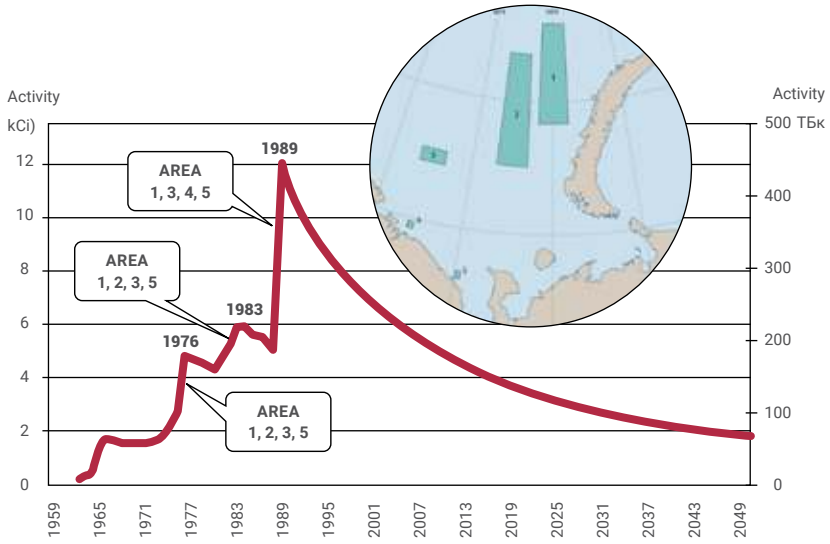
https://bellona.ru/2022/12/08/podem-so-dna-rossijskih-radiatsionno-opasnyh-obektov-zamorozhen/

In the Soviet period there were five regions in the Barents and Kara Seas where liquid radioactive waste was dumped from 1960 to 1995. A total of 320,000 cubic meters of liquid radioactive waste was dumped in the Arctic seas, which had a total activity of 958 TBq at that time. Of course, over the previous few decades activity has decreased by approximately seven times from decay and dissolution.

Solid radioactive waste was dumped in eight regions of the Kara Sea, mainly around Novaya Zemlya, at a depth from 12 to 380 meters. In these regions seven reactors were dumped with undischarged SNF, six of which were located in the reactor sections of the K-19, K11 and K-140 submarines and in the sunken K-27 submarine, and one reactor was sunk together with the screen grid of the Lenin icebreaker. The total activity of reactors containing fuel at the moment of sinking was equal to around PBq, and this has now decreased by approximately five times.

Additionally, nine reactors were sunk along with their internal machinery, but without nuclear fuel. In these regions, other solid radioactive fuel was actively dumped – separate internal reactor structures, and also objects used in the process of the operation, servicing and repair of nuclear sites. This category of radioactive waste includes roofs, screen grids, iron-water shield tanks, rods of control systems and reactor protection, empty reactor vessels, rags, filters and

CHANGES IN THE ACTIVITY OF LIQUID RADIOACTIVE WASTE DUMPED IN THE BARENTS SEA FROM 1960 TO 1992.



Source: "White Book – 2000"

http://elib.biblioatom.ru/text/tehnogennye-radionuklidy-v-moryah-omyvayuschih-rossiyu_2005/go,0/

K-27 is a Soviet nuclear submarine, the only such vessel to use liquid metal as a coolant. In September 1982, it was intentionally scuttled in the Kara Sea off the northeastern coast of the Novaya Zemlya archipelago at the entrance to Stepovoy Bay.
Photo: forum.moov-vmf.ru

http://xn--80ajbfhekjdmntqs.xn--p1ai/56-let-nazad-atomnaya-podvodnaya-lodka-k-27-ustanovila-rekord-po-podvodnomu-plavaniyu/

other metallic constructions, parts and materials. In total in the Arctic around 32,000 cubic meters of solid radioactive waste was dumped, including 17,105 containers and 18 small vessels. The activity of all solid radioactive waste which was buried without nuclear fuel came to around 16 PBq at the moment of dumping. At present activity has dropped by around 20 times.

The only sunken hazardous nuclear object in the Arctic seas is the B-159 submarine, which lies at a depth of 170 meters at the entrance to the Kola gulf near Kildin Island. At present no radioactivity emission from the submarine reactors is observed. However, it should be taken into account that this submarine was built around 60 years ago and sunk in conditions when a nuclear submarine with reactors containing did not undergo special preparation for possible sinking, i.e. the sinking took place unexpectedly and hazardously. Consequently, it cannot be expected that the structural protective barriers will continue to prevent the emission of radioactivity outside the reactor shell and submarine for a long time to come.

Another sunken object that is cause for concern is the K-27 submarine, which has highly enriched nuclear fuel in its reactors. Experts continue to discuss the possibility (or impossibility) of a spontaneous fission chain reaction occurring in the reactor, if water enters it. In any case, even if this reaction does not occur, the reactors will leak, which may cause events to get out of control.

Therefore, these two submarines (B-159 and K-27) are the first on the list to be raised from the sea bed. Rosatom declares that it has submitted a plan to the Russian government proposing to complete work on raising hazardous objects in the Arctic Ocean by 2035, and has requested 2.5 billion rubles for the next three years to prepare this operation. Rosatom states that for final completion of works to raise the objects, it requires around 22 billion rubles in present-day prices. Whether the plan to raise these hazardous objects will be realized, and when this will take place, is a big question at present.

Megatons of products of nuclear tests on Novaya Zemlya

Fallout from nuclear tests conducted on Novaya Zemlya is at present observed only in a few places where underwater nuclear tests and nuclear explosions were carried out that had contact with the surface. This took place mainly in Chernaya Bay on the southern island of the Novaya Zemlya archipelago. Here local radioactive contamination of the marine environment can be observed – for example in the seabed deposits of Chernaya bay, there are excessive concentrations of Pu-239, Pu-240 (up to 8000 Bq/kg) and Cs-137 (up to 250 Bq/kg).

Monitoring the spread of Sr-90 and Cs-137 shows that the largest total diffusion of these radionuclides is observed from the Ob and Yenisei rivers into the Kar Sea. According to observations conducted from 1963 to 1993, the magnitude of these diffusions was equivalent to around 0.0005 Pbq of Cs-137 and 0.05 PBq of Sr-90 per year. From the other main northern and Siberian rivers the diffusions were considerably smaller.

Assessing prospects for the future

The nuclear legacy of the Arctic remains a major unresolved problem. To solve it will require international cooperation, using the finest technologies and international economic, technical scientific and other resources. Nations must also share a common goal and an understanding that this problem must be solved together, as it affects the global interests of many countries.

Before the war began in 2022, when international projects were still operating, Russia was active at all levels, using its political, economic and scientific resources and making its contribution to these projects. International institutions, including governments of European countries and the USA, were interested in solving various issues to eliminate the nuclear legacy, including in the Arctic. This is shown by the projects discussed above. Bellona has devoted considerable attention to these projects in its publications, and has analyzed international participation in them.

https://network.bellona.org/content/uploads/sites/4/2021/02/2020_20_ARCTIC_10.pdf

According to Bellona's assessments, to eliminate the nuclear legacy in the Arctic, Russia received around USD 2.5 billion in international aid, not counting political, technological, information and other support.

Since the beginning of Russia's war against Ukraine, all international projects have been suspended. Many experts ask the pertinent question: will Russia continue to deal with issues of eliminating the nuclear legacy in the Arctic? Speaking for Russia as a whole, Rosatom has announced that nothing has changed, and that work on the projects will continue. But it is clear that many projects are either slowing down, or will be suspended because of a lack of resources. Bellona has also written about this.

https://bellona.ru/2023/06/07/rosatom-lies/

The most urgent project which was actively discussed at all levels before the war was the project to raise submerged and sunk objects. The priority was and remains raising the B-159 and K-27 submarines. Russia does not have its own equipment to carry out these sea operations, and it is not feasible that it will build such equipment in the near future. The political, economic and technological situation during the war, and even in the long-term post-war period, probably rules out the possibility of building platforms to raise such complex and dangerous objects as submarines in hazardous condition. All pre-war discussions of this issue came to the conclusion that for many reasons it would be more expedient to bring in foreign companies to carry out these operations, as was the case when the Kursk submarine was raised.

The remaining issues which were discussed above also depend on international assistance, primarily financial and technological. Equipment which was delivered by foreign companies to Andreeva Bay, Gremikha, Saida Bay and the Atomflot sites require servicing, spare parts etc. All of these projects have been suspended, and no one can say when cooperation will be continued. Rosatom, which is primarily responsible for projects for eliminating the nuclear legacy is becoming increasingly subject to international sanctions. Sanctions are already working against Atomflot and the company management. Furthermore, general sanctions against the Russian financial and economic system also directly affect Rosatom. So there is not particular cause to be optimistic about the future of projects to clear the Arctic of the nuclear legacy.

Thus, it is practically impossible to say for certain whether objects of the nuclear legacy in the Arctic can damage the environment, let alone to forecast the size of this damage. One can analyze the nuclear radiation threat based on the six potential sources of technogenic radionuclides remaining in the Arctic region, as assessed by experts. These are: SNF on former coastline naval maintenance bases (around 450 PBq of activity), SNF in active zones of submerged and sunken objects (around 290 PBq), SNF at repair bases (around 20 PBq), and the remaining activity is accounted for by global fallout from the discharge of northern rivers (around 33 PBq), and also radioactive emissions carried by the Gulfstream from the Sellafield nuclear complex into the Arctic seas.

Obviously, liquid radioactive waste that was dumped in the sea 30 years ago has almost completely dissolved and is safe. Solid low-level radioactive waste still emits radionuclides, but within permissible levels. The most dangerous objects are those with spent nuclear fuel located around them. These objects require constant monitoring and other more decisive actions for raising them and burying them safely. Primarily, as mentioned earlier, these objects are the B-159 and K-27 submarines. Secondly, they are all the reactors with fuel inside and high-level radioactive waste.

Unfortunately at present, one and a half years since the war began, the interested public and independent experts cannot say for certain what is happening with projects to eliminate the nuclear legacy. The reason for this is the withdrawal and closure of international programs, which means that information is no longer available to the public or experts. Bellona maintained a presence for almost 20 years on the public board of Rosatom and followed its activity, paying close attention to projects to eliminate the nuclear legacy, but at present we can only receive information from the Russian media. The reliability of this information is dubious, so we can only draw more or less correct conclusions through our own expert analysis.

What next?

What actions can Russia take next to solve the issues of the accumulated Soviet nuclear legacy in the Arctic?

Russia is applying maximum efforts for developing the Northern Sea Route, and also activating the production of minerals in the Arctic seas. As the regions of submerged hazardous nuclear objects are known, if there is an increase of activity on the NSR or in mineral production, these regions may be avoided without special difficulties. The proximity of nuclear waste is not particularly pleasant, but not critical if it is not touched. At least, avoiding hazardous regions may be much cheaper than raising submerged and sunken objects.

As for care for the environment, the authorities usually only display these concerns when they have some political, economic or other urgent incentive. At present these incentives seem to be lacking, so we may predict that cleaning up the Arctic will take on the nature of a publicity and propaganda campaign.

The concern of the international community today is of little interest to the Russian authorities, who understand that in conditions of war and sanctions there will be no economic assistance and interaction in projects to clear the Arctic region of the nuclear legacy.

It cannot be ruled out that the Russian authorities may also use the factor of blackmail. For example, they may directly state or hint that the lack of cooperation creates a nuclear and radioactive threat (for example for Norway), or that unless the B-159 submarine is raised, there will be a threat of radioactive pollution for international fishing regions. Other scenarios are also possible – establishing rules when vessels will need special permits with certain conditions, which also concern accompaniment of vessels and their safety.

In summary, we may predict that the Soviet nuclear legacy will remain a topic for discussions, study and analysis for a long time to come, but that as long as Russia's war in Ukraine continues there seems to be no swift solution to the problem.

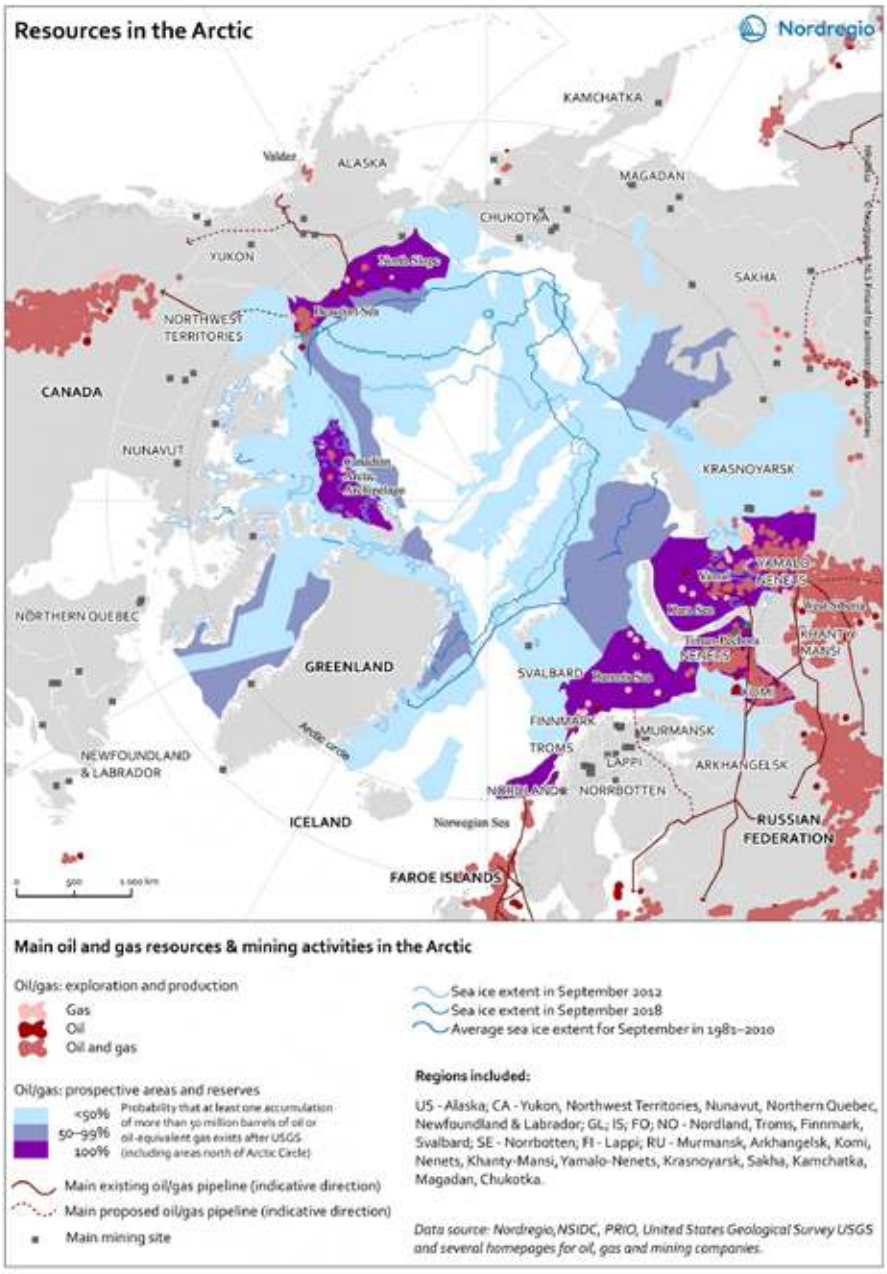
Sulfur, mercury, oil products

and persistent organic pollutants...

What can be found in the Arctic?

BY KSENIA VAKHRUSHEVA

LOCATION OF NATURAL RESOURCES PRODUCED AND WITH POTENTIAL FOR PRODUCTION IN THE ARCTIC



Source: https://nordregio.org/maps/resources-in-the-arctic-2019/

White ice stretching to the horizon, endless day, northern lights, polar bears, walruses and the rare human presence of indigenous peoples riding reindeer-driven sleds. This is often how people imagine the Arctic, a land of untouched bleak nature. But this is not quite the case. Industrialization and production of natural resources has also reached this remote area, leaving a persistent mark of industrial pollution in the pure snows.

The Arctic (the Arctic Ocean and islands, the sections of the continents of Eurasia and North America close to the North Pole, and the adjacent parts of the Atlantic and Pacific Oceans) occupies 27 million square kilometers (5.3% of the Earth's surface), and has a population of approximately 4 million people. The region is rich in natural resources – it contains 13% of the world's oil supplies, 30% of gas supplies, 19% of supplies of platinum and palladium, 10% of supplies of titanium and nickel, over 3% of zinc, cobalt, gold and silver, and there are also supplies of other rare earth metals and precious stones.

The development of natural resources in the Arctic is considered to begin with coal production on the Spitzbergen archipelago by Norwegians in the first half of the 17th century. In Russia, development of minerals in the region began in the 18th century with gold and silver mining. In the late 19th century gold was also discovered in the Arctic territories of Canada (the Yukon) and the USA (Alaska). In 1930, the first oil field was discovered in the Komi Republic by GULAG prisoners. Thus the industrial development – and pollution – of the Arctic began.

What causes pollution, and where

All Arctic countries take part in the production of natural resources (oil, natural gas, metals and coal) in the Arctic zone. For many regions, the mining industry is the main source of income, and catching fish and other seafood usually holds second place.

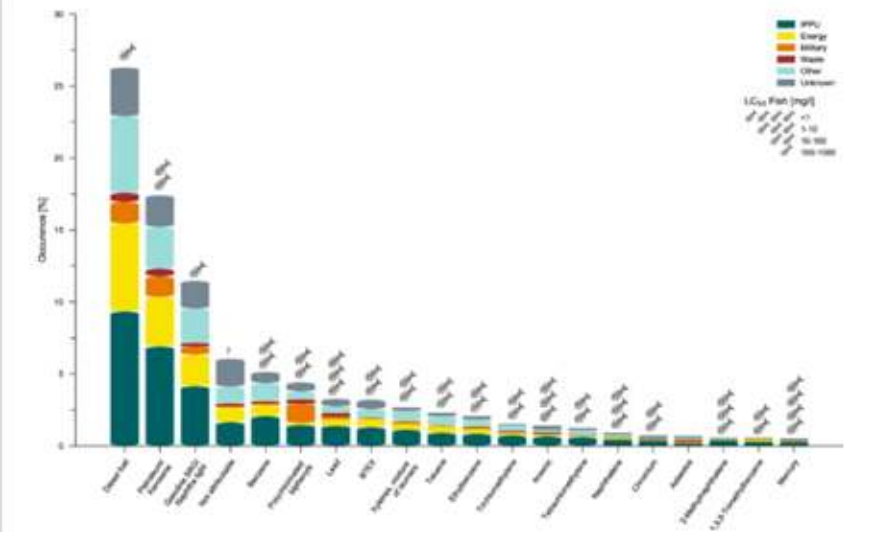
The nature of production also determines the types of pollution around industrial sites, both present and past. Studies of polluted areas of Alaska have shown that the most frequent pollutant is oil products (diesel, petrol, kerosene, ligroin). Other noticeable pollutants are benzol, polychlorinated biphenyls, lead, aromatic hydrocarbons, arsenic, other persistent organic pollutants and mercury.

Pollution of the Russian part of the Arctic is also concentrated around industrial sites producing and processing natural resources. In the mid-2000s assessments of pollution of Arctic territories were carried out as part of Arctic Council programs, which showed that on the whole the natural environment of the Arctic was still polluted and damaged less than territories of other regions in the Northern Hemisphere, and that the environmental problems of the Russian Arctic were limited to territories where natural resources are produced, processed and transported.

The largest areas of severe pollution and violation of the environment are located in the Murmansk Oblast (Apatity, Kirovsk, Kovdor, Olenegorsk, Monchegorsk), in the north of Central Siberia (Noriilsk – Talnakh), in the north of Yakutia (Deputatsky), and on the Chukotka peninsula (Valkumei, Pevek, Shmidt). Around mining regions, there are extensive zones of damaged lands with physical degradation of the landscape and chemical pollution of soils, which negatively impacts local ecosystems, sometimes leading to complete desertification.

In 2008 as part of the UN program for the environment, an analysis of the most polluted territories of the Russian Arctic was carried out, on the basis of which 12 impact regions were singled out – territories with severe technogenic violations of the natural environment with a harmful impact not only on prospects of preserving the natural resource potential, but also on the health and well-being of the population

Fig. 4: Toxic substances at contaminated sites in the permafrost dominated regions of Alaska.



Source: https://rdcu.be/diVT9

Over the past 15 years the situation of environmental pollution in the Russian Arctic has not improved fundamentally, despite targeted efforts to reduce emissions at some plants (for example, sulfur emissions at some of the Nornikel plants) and to clear emission sites of rubbish left from Soviet times (the "Clean Arctic" project). The data of a state report on the state and conservation of the environment in Russia for 2021 shows that in industrial Arctic towns, the maximum allowable concentration (MAC) of pollutants in the atmospheres and in surface waters is often exceeded, and the amount of oil products released into the environment is increasing.

In Anadyr, Norilsk and Severodvinsk in 2021 the average concentration of suspended matter in the air exceeded MAC for the year average by 1.3, 1.5 and 1.7 times respectively. The maximum one-time concentration of suspended matter came to 9.2 MAC in Norilsk, 3.4 MAC in Severodvinsk, 1.7 MAC in Vorkuta, 1.2 MAC in Novodvinsk. The maximum single concentrations of sulfur dioxide exceeded MAC in Norilsk by 43.9 times and in Monchegorsk by 2.8 times. The average annual concentration of sulfur dioxide in the atmosphere of Norilsk exceeded MAC by 3.1 times. In Monchegorsk, high concentrations of sulfur dioxide in atmospheric air caused by emissions from the Kola GMK plants (mining and production of copper and nickel), and in Norilsk by GMK Nornikel (mining and production of copper, nickel, cobalt, palladium and other rare metals). In Nikel, Novodvinsk, Murmansk, Monchegorsk, Severodvinsk, Arkhangelsk, Vorkuta, and Zapolyarny, the average annual concentration of formaldehyde exceeded MAC by 1.3-5 times.

Pollution of surface waters in the Arctic zone is also variable, and especially noticeable in regions of the mining industry. In 2021, a high level of pollution of fresh-water surfaces was found in 227 cases at 37 water bodies, and an extremely high level of pollution in 147 cases at 31 water bodies. In the period of 2014-2021, the amount of cases of high and extremely high pollution levels increased by 40%. Most of them were observed in the Murmansk Oblast. Around 60% of all cases in the region are connected with pollution of surface waters of compounds of heavy metals, with the maximum content comprising: copper – (800.0 MAC) – Kumuzhya River, Monchegorsk; molybdenum – (8.6 MAC) – Imandra Lake, Apatity; iron (217.0 MAC), fluoride – (19.9) – unnamed creek, Kandalaksha; manganese – (61.0 MAC) – Virma River, Lovozero village, by Iszbyany Lake; nickel – 120.0 MAC), mercury – (16.2 MAC) – Nyuduai River, Monchegorsk.

Besides air and water pollution, production of natural resources leads to

IMPACT REGION	SOURCE OF POLLUTION	PRIORITY POLLUTANTS	ECOLOGICAL STATE OF TERRITORY
WESTERN KOLA	Non-ferrous metallurgy, mining industry	nitrogen dioxides, dust, heavy metals (Cu, Ni, Co), carbon fluoride	Crisis level
CENTRAL KOLA	Non-ferrous metallurgy, mining industry, NPP, transport	Sulfur and nitrogen dioxides, heavy metals (Cu, Ni, Co, Pb, Cr), dust, strontium, phosphorus, radionuclides	Crisis level (catastrophic in the case of an accident at the NPP)
KARELIA	Pulp and paper industry, forestry complex	Carbon, nitrogen and sulfur dioxides, methylmercaptan, methanol, mercury, furfurol, phenols	Tense
ARKHANGELSK	Pulp and paper industry, machine building, forestry complex, thermal power, transport	Hydrogen, nitrogen, sulfur dioxides, heavy metals, lignosulfates, methylmercaptan, phenols, formaldehyde, polycyclic aromatic hydrocarbons (PAH), methanol	Critical
TIMANO-PECHORSKY	Production and transport of raw hydrocarbons	Oil products, carbon, nitrogen, sulfur, heavy metals, PAH	Critical
VORKUTA	Mining industry, thermal power, construction industry	Dust, heavy metals, PAH, soot, hydrocarbons	Critical
NOVOZEMELSKY	Military sites (center of infrastructural programs), submerged nuclear installations and other radioactive waste	Radionuclides, heavy metals	Critical (potential crisis level)
LOWER OB	Production and transportation of raw hydrocarbons	Oil hydrocarbons, PAH, heavy metals, radionuclides, soluble salts	Critical
NORILSK	Non-ferrous metallurgy, mining industry	Sulfur and nitrogen oxides, heavy metals, dust, arsenic, formaldehyde, soot	Crisis level
YANO-INDIGIRSKY	Mining industry	Dust, heavy metals, mechanical violations of geosystems	Tense
WESTERN CHUKOTKA	Mining industry, NPP	Heavy metals, dust, radionuclides	Tense (catastrophic in the case of an accident at the NPP)
EASTERN CHUKOTKA	Mining industry	Heavy metals, dust, PAH, hydrocarbons, soot	Tense

Source: https://archive.iwlearn.net/npa-arctic.iwlearn.org/Documents/PINS/hot_spots_2008.pdf

degradation of soils and accumulation of production waste. As of late 2021 in the Arctic Zone of Russia there were 251,500 hectares of damaged lands (an area equivalent to the city of Moscow including the territory of New Moscow, or Luxembourg), and only 4.2% were recultivated. Annually, Arctic industry produces around 462 million tons of waste, 0.05% of which is decontaminated and around 20% recycled.

Pollution from the oil industry is of a dual nature. Firstly, there are direct spills of oil and oil products into the environment. According to data from researchers from the Far East Federal University of Russia, several hundred thousand tons of oil products are carried into the Arctic Ocean annually from river discharge alone. As a result, the concentration of oil products in many regions of the Barents, White and Kara Seas and the Laptev Sea exceed the norm by 2-3 times.

The second aspect is air pollution by products of associated gas combustion. Flame combustion is one of the main sources of air pollution in the Arctic with soot (black hydrocarbon). A joint study by Norwegian, Finnish and Russian scientists showed that 42% of the surface concentrations of black hydrocarbon in the Arctic was accounted for by burning associated gas. In the world as a whole this figure comes to just 3%. In 2021, at the Prirazlomnaya sea platform in Russia, 140.57 million cubic meters of gas was burnt. Emissions of black hydrocarbon in the Arctic have a strong impact on climate change. Particles settle on the

snow and ice covering and darken it, which increases absorption of sun rays and surface heating.

A catch basin for international industry

Besides pollution from plants located on Arctic territories, owing to the geographical location and the nature of the motion of air and water masses, waste from industry of the entire Northern Hemisphere flows to the Arctic. Pollutants, carried in rivers and by sea currents, enter the Arctic Ocean, move with air masses from southern regions to the pole, and settle with precipitation and remain in the ice for many years.

Monitoring and analysis of the state of the environment and the concentration of various pollutants in the Arctic is carried out by specialists at the Arctic Monitoring and Assessment Program (AMAP), launched as part of work by the Arctic Council in 1991. According to their assessments, of greatest concern is pollution of the Arctic by persistent organic pollutants (POP) and heavy metals, primarily mercury.

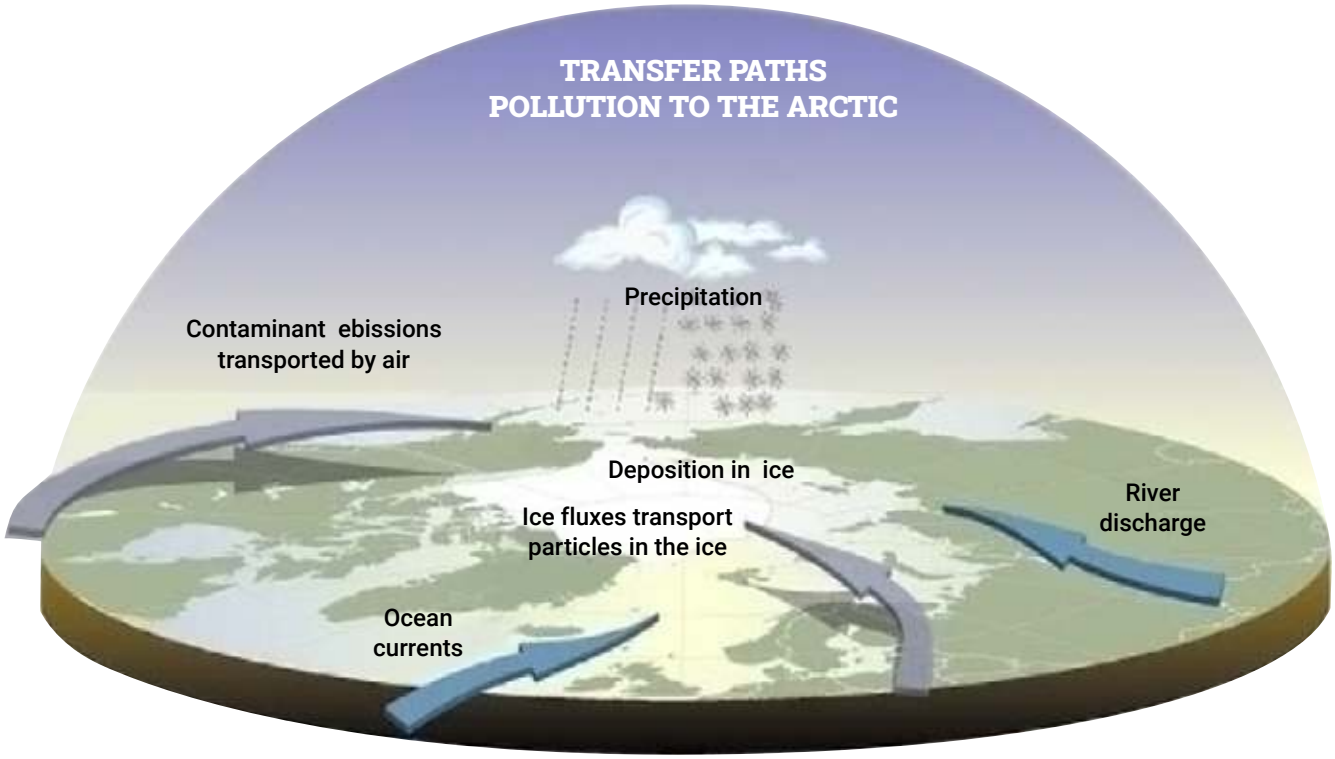
POP are toxic chemicals contained in pesticides, insecticides, solvents, pharmaceutical products and products of the chemical industry. They include 12 organic compounds: aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobutadiene, polychlorinated diphenyls, Dichlorodiphenyltrichloroethane (DDT), dioxins and polychlorinated dibenzofurans. They may be carried over large distances, mainly by air, remain for a long time in the environment in unchanged form, accumulate in ecosystems and have a significant negative impact on the health of humans and other biological species.

People absorb these chemicals in different ways, mainly through food and the air. Almost half of the diet of indigenous peoples of the Arctic consists of local food products, primarily of animal origin (whale, walrus, seal, reindeer etc.). As it moves up the food chain, POP accumulates in the fat tissues of animals and is thus absorbed by humans.

AMAR data on the POP content in the environment, animal and human tissue in the Arctic has made a major contribution to talks on international agreements to restrict the use of individual types of POP in industry worldwide. The result was the Protocol on persistent organic pollutants to the UNECE convention on trans-border air pollution over large distances (signed in 1998) and the Stockholm convention on persistent organic pollutants (signed 2001, entered into force in 2004).

After these documents entered into force, the level of pollution of many types of POP in the Arctic began to decrease noticeably, including in the blood of Arctic residents, although changes vary depending on the region. In some Arctic regions, the POP level continues to remain several times higher than in non-Arctic countries or non-Arctic regions of Arctic countries. The highest concentrations of POP among Arctic residents were recorded in Greenland and on the Faroe Islands, in Nunavik (northern Quebec, Canada) and in the coastal region of Chukotka (northeast Russia).

Besides POP, the production of which is regulated by international documents, AMAR researchers also detect new chemicals which may pose a danger to the environment of the Arctic and the health of its residents. In 2016, a report was published on chemicals that cause concern in the Arctic. It includes data on concentrations of 25 substances determined as high priority for monitoring. These substances were selected as a result of screening around 150,000 chemicals permitted for sale in Europe and North America. After an analysis of their physical and chemical properties and databases on production and use, researchers detected around



Source: www.amap.no

1,200 substances which may be carried over large distances and reach the Arctic; 25 of them were determined to be high priority because of the prospects for their spread and harmful impact on the health of animals and humans. Unlike traditional POP, they are spread over long distances mainly by sea currents, not by air.

As many of these substances are used in consumer goods (for example in electronics, clothing, furniture, plastics), as well as in construction and insulation materials, their presence in the Arctic may not only be caused by their spread over large distances, but they may also come sources within the region. The local sources in this case are Arctic towns and villages, and places for the production and processing of natural resources. In general, growing economic activity in Arctic regions leads to a high risk of pollution by these chemicals.

Content of heavy metals decreases

World industry not only brings organic pollutants to the Arctic, but heavy metals as well. They enter the environment both from industrial plants located in Arctic regions, and from the outside, with river currents, sea currents and by air. They are then absorbed by animals and humans, negatively impacting health. Heavy metals, including mercury, lead, cadmium, copper, arsenic, cobalt, nickel have long been known to be dangerous, but international successes to regulate the production and treatment of products containing heavy metals have only become noticeable quite recently.

In 2013, the Minamata convention was signed, which restricts the production and sale of products containing mercury (for example luminescent lamps, mercury thermometers, electric batteries etc.). After the convention was signed the concentration of mercury in the air of the Arctic began to gradually decrease.

Widespread lead pollution, including in the Arctic, was mainly spread through the use of lead tetraethyl as an additive to automobile fuel. Since the early 2000s, countries began to gradually abandon this additive, using less toxic substitutes; the production and use of petrol containing lead was thus entirely stopped worldwide by 2021.

Efforts by countries to reduce emissions of heavy metals have been reflected in the data of monitoring in the Arctic. The Norwegian station on Spitzbergen noted a decrease in the concentration of mercury and lead in the atmosphere from the early 1990s.

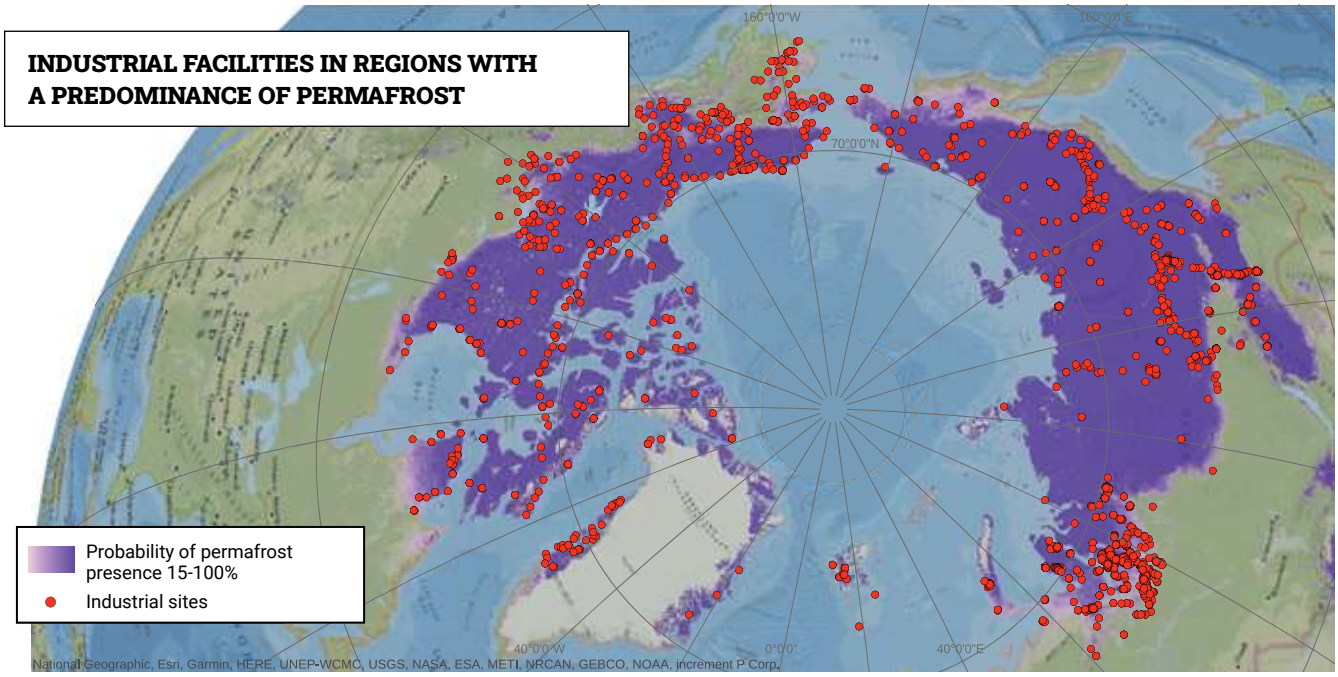
According to AMAR data, levels of mercury in the blood of pregnant women in the Arctic also dropped from the 1990s, although in Nunavik (Canada) and Greenland this figure remains 4-5 times higher than in other Arctic regions. Levels of lead in the blood have also generally decreased, while the highest figures are found in several regions of the Canadian and Russian Arctic. In some cases the impact of metals may be higher near specific sources of pollution – for example people living near mines and other specific sources in the Pecheng region of the Murmansk Oblast in Russia, have higher blood levels of manganese, cobalt, nickel, copper, zinc, arsenic and lead.

Arctic Circle - Nunavit CANADA
Photo: Colleen / www.flickr.com/

https://www.flickr.com/photos/wildrose/5749191147/in/photolist-9L37ei-2c8zi2Y-6qnLkb-4ZXtup-yBDU5G-QwpMvq-CtmM4s-d9HPxb-2bE6puC-2ocju8h-2mszk79-sEyLq2-2oPCnym-2oPBTMX-gQVpfP-6kdhJb-6k97Ji-2dLZ-NrhL7-oLRSCB-ouDhVy-oM8DXZ-oK6LA5-6kdj69-6kdiMh-WwFpB5-6k97yT-6k97Pc-5BneGp-2oPy9eY-2ohzyzT-WwFkS1-VmYWST-2ocgS4U-4aHA7h-2ohcGcw-WAyoi2-5ocbBF-2ha54Ye-5eapxo-6kdiX9-6k985X-ouDLeR-6k98r4-6kdiPN-oK6RXh-oLRHiK-6k98zH-2hoGmE6-ouDzHG

Radioactive pollution

Radioactive pollution of the Arctic deserves separate discussion. Like other pollutants, radionuclides reach the Arctic zone not only from local, but also from remote sources, carried by ocean currents and air masses. The main radioactive pollution of the Arctic took place during nuclear testing in the open air conducted by the USSR on Novaya Zemlya, and also by the USSR and other countries in the Northern hemisphere from 1945 to 1995. The fallout of radionuclides after these



Source: https://www.nature.com/articles/s41467-023-37276-4#Fig4

explosions took place in all Arctic regions above the 60th parallel, and the highest figures were recorded in Iceland, Norway and Sweden.

The cases, including the crash of a plane transporting nuclear weapons at the Thule airbase in Greenland (1968), the wreck of the Komsomolets nuclear submarine in the Norwegian Sea (1989), and the disasters at the Chernobyl (1986) and Fukushima (2011) NPPs also led to emission of radioactive substances and their spread to the Arctic. Liquid radioactive emissions from plants for processing spent nuclear fuel in France (La Hague) and the UK (Sellafield) entered the northeastern Atlantic and were brought by currents into the North Sea and then into the Arctic.

According to monitoring and assessment data by the Arctic Council, concentrations of anthropogenic radionuclides in the Arctic are now sufficiently low, and have dropped since the mid-2000s. But nuclear sites on the territory of the Russian Arctic left over from the Soviet period continue to present a potential hazard of radioactive pollution of the region. (Another article in our journal discusses the state of these sites in detail – "The nuclear legacy of the Arctic: tidying it up without international aid will be tough).

Microplastics in the ice

Annually, around eight million tons of plastic waste are dumped in the world ocean. Part of it reaches the Arctic by sea currents, and disintegrates into particles of microplastics (small pieces of plastic not larger than five millimeters) and accumulate in the Arctic ice. Scientists at the Norwegian polar institute calculated that one liter of melted Arctic ice could contain up to 234 particles of microplastics – much more than in a liter of water from the open ocean. Similarly, the amount of microplastic particles found in birds' stomachs in 2013 was significantly higher than in the 1970s.

According to scientists' data, up to 80% of plastic waste in the sea near Spitzbergen comes from fishing nets, both local and carried by currents. It used to be common practice to throw tangled nets overboard, but now fishing vessels increasingly bring these nets back to the shore, and also recycle other plastic litter caught in the nets along with fish.

There are not yet sufficient studies about how the content of microplastics in living organisms impacts their health, but the AMAP report cites scientists' data that microplastic particles are chemically and physically detrimental to the productivity and development of fish larvae. Microplastics are included by Arctic Council specialists on the list of chemical substances which require increased monitoring, and measures to reduce their dumping in the environment.

Will the Arctic get cleaner?

The prospects of industrial pollution of the Arctic that currently concern researchers are connected not just with local industry, and not even with the spread of pollutants from non-Arctic regions, but with climate change. It is expected that a rise in temperature, the melting of sea ice and permafrost may cause the thawing, remobilization and evaporation of pollutants currently "trapped" in the ice into the atmosphere and ocean in the Arctic.

Researchers from the Alfred Wegener Institute of Polar and Sea Research predict that by the end of this century, the sites of around 1,1000 functioning industrial facilities and from 3,500 to 5,200 polluted sites will start to thaw out which are located in regions of stable permafrost. To avoid future secondary pollution of the environment in the Arctic, scientists say that long-term planning strategies are required for industrial and polluted territories which take into account the consequences of climate change.

Additionally, experts at the Arctic Council warn that large forest fires and agricultural burning will increase the spread of organic pollutants to the Arctic. Further development of oil and gas activity, mining of minerals and shipping in the Far North may also lead to an increase in the spread of several pollutants.

Crossing the Zero Line

What is happening in the Arctic, and are plans for adaptation ready yet?

BY FYODOR SEVERYANIN

The Arctic is perceived in different ways. Some think of it as a region of polar bears, for others it is a treasure trove of minerals, and for its indigenous peoples it is a home. But for everyone on the planet, the seemingly remote Arctic has huge importance, as the ice cap of the region reflects the sun's rays, and forms the cold currents and air masses that cool the planet. And it is extremely dangerous to ignore the fact that the Arctic heats up more quickly than other regions of the planet, and thus influences the entire global climate system.

According to the sixth assessment report by the IPCC, climate change in the Arctic region takes place much more drastically than for the planet on average. The increase in the average surface air temperature is more than twice the global figure. This is already leading to extreme weather phenomena, and many animal species are under threat, as are the lives of indigenous peoples.

How climate change affects the Russian Arctic

The main signs of the swiftly changing climate in the Arctic are an

https://www.shutterstock.com/ru/image-photo/northern-lights-photographed-senja-region-norway-1426196675

increase in concentration of greenhouse gases, rising temperatures, a reduction in sea ice, permafrost thawing and a greater frequency of extreme weather phenomena.

Reliable sources of scientific information about climate change are primarily materials from the IPCC, Rosgidromet (the Russian Federal Service for Hydrometeorology and Environmental Monitoring) and specialized institutes of the Russian Academy of Science, which in recent years have actively studied climate change both in Russia as a whole and in the Arctic region in particular. In 2022, Rosgidromet published its Third assessment report on climate change and its consequences in Russia, based on materials from scientific articles and monographs, and also national and international assessment reports. Along with monitoring data, the report contains assessments of future climate changes and their impacts on natural systems, the population and different sectors of the economy. Nevertheless, the Arctic and the natural processes taking place in it remain very poorly studied because of the inaccessibility of the region and the weak monitoring system.

Sea ice and permafrost

Warming in the Russian Arctic causes a reduction in sea ice in all months of the year, but most drastically during the summer period. The area of sea ice in Russian seas at the end of the summer season, in September, decreased by six times over ten years, from the mid-1990s to the mid-2000s, from over 1,200,000 sq.m. to ~200,000 sq.m. In recent years, the area of the ice has varied, mostly keeping below this level, with a minimum of 26,300 sq.m. recorded in 2016.

The reduction in sea ice is often seen to provide new possibilities for shipping and fishing in higher latitudes, and also for tourism. In 2021, the minister for natural resources and the environment Alexander Kozlov said in an interview with RBK that the phenomenon of permafrost in northern territories is "vanishing": "Every one of these regions understands what will happen to it in 20-30 years: it will cease to be northern or suddenly become highly agricultural". But in discussing the "benefits" of climate change, the related consequences that cause enormous losses are often ignored. For example, the reduction in ice harms animals that need the ice cover and may lead to the extinction of species. Additionally, a lack of ice exacerbates the impacts of storms and causes coastal damage. Flooding of coastal regions caused by extreme weather phenomena may make it impossible to use ports and transport systems connected to them, cause damage to terminals, logistic centers, storage and loading zones, and disrupt supply chains for a lengthy periods of time.

Predictions of permafrost thawing show the possibility that 70% of the present permafrost area may be affected. Permafrost thawing will cause the destruction of the existing transport, residential and industrial infrastructure, and currently around 70% of the existing infrastructure in the Russian Arctic zone is located in regions with a high susceptibility of thawing of permafrost soils.

Permafrost thawing is already causing environmental disasters, as annually several hundred oil spills are caused by pipelines bursting because of soil subsidence. After a spill of 21,000 tons of diesel fuel in Norilsk in 2020, special attention was given to the environmental safety of fossil fuel facilities. Although there is no consensus about the connection between disasters and soil thawing, a major problem has been revealed when hazardous facilities are incorrectly operated in thawing permafrost without proper supervision,

and in the coming years this may lead to further environmental disasters.

Assessing the climate risks, the authorities of the Yamal-Nenets Autonomous District calculate that the bearing capacity of pillars on average for the district will decrease by 53% in sands and 42% in clay soils. Permafrost to the south of the 64th northern parallel will thaw out completely, in the south of the Purovsky and Krasnoselkupsky regions, as well as by 12% in peats with mineral substrate, which may even cause buildings to collapse.

When thaw subsidence takes place because of seasonal thawing or soil expansion, linear structures are damaged, such as railroads and vehicle roads, airport runways and pipelines. The bearing capacity of soils of structural foundations may become weakened, in particular airport runways in the Republic of Sakha (Yakutia), and there are also risks of flooding and soil erosion in the inter-seasonal period, causing runways to become unfit for use and making it impossible for planes to land. The lack of ground transportation means that this is a crucial issue, as at present the Republic of Sakha has a total of 32 airports and 160 airfields, 90 of which operate socially significant flights.

By 2030, according to Rosgidromet's Third assessment report by, the coast of the Kara Sea will recede, at the highest rate in the north of the Yamalsky and Tazovsky regions, the coastal regions of Bely Island, by up to four meters per year. Beside the direct impact of the rising temperature on permafrost thawing of coastal cliffs, there will be an even greater indirect impact from warming, leading to a reduction of sea ice, and consequently an increase in the length of ocean waves' shorebreak and a longer ice-free period. This will especially affect the northern areas of the region.

Temperature and extreme phenomena

According to Rosgidromet data, in the period from 1960 to 2020 the greatest increase in temperature in both the warm period (April – October) and cold period (November – March) was recorded in Yamal, Taymyr and the coast of the East Siberian Sea, coming to 0.5-0.6 °C every 10 years. In the north of the European part of the Arctic and on Chukotka, the air temperature in the warm period is increasing at a rate of 0.3-0.4 °C every 10 years, and in the cold period at a rate of 0.4-0.5 °C every 10 years.

Rosgidromet's Third assessment report states that the annual repetition of hazardous meteorological phenomena in the Arctic Zone is caused primarily by severe blizzards and high wind speeds. On Yamal and in north Yakutia in this period, several cases of extremely high temperatures were also recorded. In the Western Arctic, warming in the cold period of the year has negative consequences: there is an increase in the number of days when the air temperature fluctuates around zero, causing damage to infrastructure and ice formation, and a decrease in the number of winter days with favorable weather conditions. The increase in extreme temperatures during summer and the number of days with hot weather conditions has a negative impact on the environmental situation in industrial regions and on human health.

Climate changes and their environmental consequences affect the health of residents of Arctic towns and the indigenous population of the Arctic zone. People may die from heat waves or cold snaps, from a rise in infectious

Climate change is having a detrimental effect on the reindeer population. The cold snap that followed the abnormal heat froze the thawed ground many centimeters thick, depriving the animals of the opportunity to obtain food. A defrosted cattle burial ground with anthrax spores aggravated the situation, leading to the deaths of thousands of deer.

diseases, both due to the changes in habitats of infectious agents, as well as when water is infected by damaged pipelines and other sanitation structures.

On the Yamal peninsula in 2006 and 2013, over 80,000 reindeer died as a result of anomalously high temperatures. Warming caused the ice to recede, followed by a season of torrential rains, and the subsequent cold snap caused extensive territories to become frozen over for many months, depriving the animals of access to food – lichen and other vegetation. Reindeer bucks can only access food through ice that is not more than two centimeters thick. In 2006 and 2013, the ground froze to a depth of dozens of centimeters.

In 2016 the situation was aggravated by an outbreak of anthrax. A subsequent analysis showed that the outbreak was caused by the anomalous heat and the thawing out of a burial ground for cattle dating from 1941. Reindeer accidently came across the burial ground and became infected, as anthrax spores can survive for a whole century. The resulting outbreak not only killed reindeer, but also one child, and dozens of people were hospitalized.

Greenhouse gases

According to data from Russian pollution monitoring stations, in 2022 rates of CO_2 concentration grew in comparison with 2020 and 2021. The increase of concentration for 2022 was 3.4-3.5 parts per million (the standard unit for measuring gas concentration), which is significantly higher than the average global growth rate for the last 10 years.

The average annual concentration of methane at Russian Arctic stations in 2022 reached record levels, approaching 2,020 parts per billion. The tendency for a high growth in methane concentration began to be seen from 2019, when high levels of concentration were registered at the Tiksi station during the period of maximum natural emissions (August – September). In 2020, methane levels at this station remained high until the end of the year, and this tendency also began to be seen at the Teriberk station. The tendency for a rise in growth rates of methane concentration is not only seen at stations of the Russian Arctic coast, but all over the world.

The Arctic is sometimes called a methane bomb, because it contains a huge amount of frozen organic matter that is constantly thawing out. The release of methane may lead to a considerable acceleration in the rise of the global temperature, which in its turn causes faster thawing with a greater release of methane. According to these pessimistic scenarios, humanity's decarbonization efforts may not have any impact on the global climate whatsoever, as reversing these processes will be impossible.

What is happening at present

All studies and all observed trends clearly show that from year to year the destructive consequences for nature, human beings and infrastructure will only intensify. Russia has set itself the goal of achieving carbon neutrality by 2060, and in 2021 the strategy of socio-economic development of the Russian Federation was approved, with a low level of greenhouse gas emissions until 2050. But recently officials have increasingly begun to voice doubts that these figures are attainable, because of Russia's war and the subsequent decrease in international cooperation in the field of low-carbon development. The ongoing war has "frozen" decarbonization plans, although

https://www.flickr.com/photos/dration/6522548541/

it has not cancelled them completely. At present Russia is concentrating on adapting to climate change in the short-term and long-term perspective, and only recently began to develop plans and assess climate risks.

Given the Russian economy's profound dependence on fossil fuel, issues of decarbonization are discussed with little enthusiasm, and the climate agenda mainly focuses on adapting and preparing for worsening conditions.

Documents with relevance today

The national plan of events of the first phase of adaptation to climate changes in the period until 2022 was approved by a Russian governmental decree in 2019. The first phase involved analyzing risks and developing adaptation plans. In March 2023, the government moved to the second phase of adaptation to climate change in the period until 2025, where the procedure for financing events for adaptation to climate change should be established, as well as insuring climate risks in sectors of the economy and regions of the Russian Federation, and measures to support the resettlement of people living permanently in risk zones of environmental disasters. It is planned to prepare projects of the appropriate federal laws in early 2024.

The list of normative legal documents for climate adaptation and regulation and registration of greenhouse gas emissions.

– Decree of the government of the Russian Federation of 11.03.2023 P № 559-r "On approving the national plan of events of the second phase of adaptation to climate change in the period until 2025".

– Decree of the government of the Russian Federation of 25.12.2019 № 3183-r "On confirming the national plan of events of the first phase of adaptation to climate changes in the period until 2022".

– Decree of the Russian Ministry of Economic Development of 13.05.2021 № 267 "On confirming methodological recommendations and indicators of adaptation to climate change".

As for the Russian regions, initially they were supposed to prepare plans for adaptation by 30 September 2021. Then the deadline was extended to 10 May 2022. At the end of December last year, at a session of an expert council of the Committee of the Federation Union for agrarian production policy, it was established that 42% of the regions had not started this work.

The Arctic zone of the Russian Federation comprises nine regions: four of them entirely in the Arctic – the Murmansk Oblast, the Yamal-Nenets Autonomous District, the Nenets Autonomous district, the Chukotka Autonomous District; and five are partially located in the Arctic – the Republic of Sakha (Yakutia), the Republic of Karelia, the Republic of Komi, the Krasnoyarsk Krai, and the Arkhangelsk Oblast. According to data from the Climate platform, plans have been passed in the YNAD, Yakutia, the Arkhangelsk Oblast and on Chukotka, and plans are being developed in the Krasnoyarsk Krai, Komi and Karelia, but in the Nenets Autonomous District and the Murmansk Oblast the fate of these plans is unknown.

The plan for the YNAD has been sufficiently well developed, proposing the introduction new modern technologies to provide monitoring and predict emergency situations, incidents and accidents (robotics, drones, smart video surveillance systems etc.), and the forecast of permafrost degradation is given special attention. It is also planned to develop a regional construction standard taking climate change into account, organize anti-erosion systems and create a scientific test ground to study the resilience of vehicle roads in the permafrost zone. Particular attention will be given to developing measures for disease prevention, taking into account the climate, environmental/health and medical/ demographical characteristics and ethnic structure of the population.

Adaptation plans in other Arctic regions are rather poorly developed, and often the measures in these plans are already included in other state programs, for example converting vehicles to gas motor fuel, which in itself is a mistaken decision as far as combatting climate change is concerned.

Besides the regions, a separate plan of adaptation has been developed for the Russian Arctic zone, which coincides with all sector plans of adaptation, and is also taken into account in preparing regional plans of Federation subjects in the Arctic Zone.

The list of normative legal documents for climate adaptation and regulation and registration of greenhouse gas emissions

- Decree of the government of the Russian Federation of 11.03.2023 P № 559-r "On approving the national plan of events of the second phase of adaptation to climate change in the period until 2025".
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- Decree of the Russian Ministry of Economic Development of 13.05.2021 № 267 "On confirming methodological recommendations and indicators of adaptation to climate change".

Corporate plans of adaptation

Major companies that are responsible for causing climate change also assess climate risks. For example, the Gazprom energy company has developed a project of possible scenarios of climate change at the locations of its facilities. Since 2022, the oil and gas company Rosneft has been realizing a comprehensive long-term scientific program in the seas of the Russian Arctic – according to the company, it is compiling a database on

the natural climate conditions of the Arctic shelf, studying the main zones of iceberg formation and developing methods for changing the trajectory of iceberg drift.

In 2020, the LUKOIL group held a study to find the main factors and tendencies affecting the reliability of technical equipment and the safety of personnel at industrial facilities producing and processing hydrocarbons, and also electricity, which served as a basis for developing measures and projects. Undoubtedly, these assessments are important for reducing risks, including economic ones, but the only thing these plans lack is a transition to zero emissions, which is essential to achieve the climate goals that Russia has also committed to.

International cooperation

Despite the war, Russia continues to take part in important international projects and climate research programs in the World Meteorological Organization (WMO), the UN Framework Convention on Climate Change (UNFCCC), the Intergovernmental Council for Hydrometeorology of the CIS (ICH CIS), the Intergovernmental Oceanographic Commission (IOC), UNESCO, the International Council for Science (ICSU) and other organizations such as

– the UN Environment Program (UNEP);

– the World Climate Program (WCP);

– the World Climate Research Program (WCRP);

– the Global Climate Observing System (GCOS);

– the Global Ocean Observing System (GOOS);

– the Global Sea Level Observing System (GLOSS);

– the Global Earth Observation System of Systems (GEOSS);

– the WMO Global Atmosphere Watch Program (GAW);

– the World Climate Services Program (WCSP) and PROVIA

– the UNESCO Intergovernmental Hydrological Program (IHP);

– the Arctic Council.

Participation in these projects is undoubtedly complicated by the ongoing war which makes long-term planning of joint projects difficult, causing events in Russia to be cancelled and studies to be postponed. But despite all these difficulties, Russia has yet to be excluded from institutions and agreements within the United Nations.

NGOs

Previously, international and regional NGOs actively worked on protecting the climate in the Arctic. They informed the public about the consequences of climate change, took part in developing policies and measures to mitigate climate change. The environmental organization Greenpeace conducted information campaigns and protests against the industrial production of oil and gas in the Arctic. The most memorable episode was the capture of a Greenpeace vessel in the Barents Sea in 2013 after the organization held protests at the Prirzalomnaya oil rig. The World Wildlife Foundation (WWF) conducted scientific research and worked with local communities to preserve vulnerable species, such as the polar bear. The environmental organization Bellona has worked for many years to keep the Arctic safe from nuclear waste and industrial pollution.

Regional NGOs had considerably fewer resources for conducting their campaigns, but they worked actively on raising environmental awareness, especially at study institutions. On several occasions, the proposal was put forward to declare the Arctic a world sanctuary, analogous to the Antarctic, significantly decrease economic activity there, concentrate efforts on scientific activity and preserve biodiversity. Bellona, Greenpeace and the WWF were declared undesirable organizations in Russia in 2023, and their Russian offices were closed. "Undesirability" is the harshest type of status, and forces organizations with offices and employees in Russia to close down all activity to avoid criminal prosecution. The organizations directed their efforts to removing and blocking resources, as Russian legislation requires. Regional organizations were deprived of their last resources, and were also declared to be foreign agents and subsequently closed down, for example the environmental organization "Movement 42", which worked in the fields of waste recycling, separate rubbish collection, and environmental education.

This means that there are no independent public environmental projects left in the Russian Arctic today. Only the pro-state organization "Green Patrol" remains, which with the support of Rosatom and Nornikel organizes volunteers to collect litter around Arctic settlements.

Instead of a conclusion

Methane funnels, thawed out cattle burial sites contaminated with anthrax, record concentrations of greenhouse gases, fires in Arctic wastelands and oil spills graphically illustrate the need for countries around the world to direct their efforts to combat the climate crisis. As numerous conferences and forums are held, with impressive speeches by heads of state on the need for urgent actions, irreversible processes are taking place in the Arctic, while climate change seems to be a minor issue in lower latitudes, and especially in big cities.

Climate change not only threatens the indigenous population and biodiversity, but also hinders companies from producing more natural resources, especially hydrocarbons. Few managers and officials focused on economic prosperity have give a thought to the fact that it is these very hydrocarbons that cause irreversible changes. They still live under the illusion that hydrocarbons are not going to run out any time soon, and that this will only be a problem for future generations. But in the Arctic everything takes place at a much faster rate, and in our lifetime we may see the most unimaginable and terrifying consequences: from the complete extinction of several animal species to the spread of fatal viruses. In fact, this is already happening right now, as scientists from all over the world can testify, including in Russia.

We still know little about the Arctic region, while money for financing scientific research and monitoring is now spent on waging war, and the development of green technologies grinds to a halt as specialists leave the country and international cooperation is suspended. It will take years to return to the pace required to tackle the climate crisis, which even before the war lagged far behind the targets set out in the Paris agreement.

From West to East

Russia's history of international cooperation in the Arctic

BY KATJA DOOSE, PhD, Senior researcher, University of Fribourg (Switzerland)

The Arctic has often been associated with either the race for resource and territory , or with the romantic idea of Arctic exceptionalism that sees the region as one of peace and as apart from international relations. Needless to say, neither one nor the other reflects the complex situation in the Arctic properly. While firm international norms and legal frameworks are in place that make a sensationalist "race for resources" unlikely, the Arctic is also by far not a zone of peace devoid of national interests. Instead, conflict and cooperation are closely entangled in the region and have been determining its environmental and economic situation throughout the 20th century. This becomes particularly evident when looking at the history of scientific collaboration. Indeed, while the ice masses in the Arctic have changed and the collaboration between the Arctic states has taken different shapes, the Arctic, its climate and its resources have always been enough reason to collaborate for Arctic scientists, even in times of political disagreements. Following Russia's invasion of Ukraine in 2022 scientific cooperation in the Arctic has for the first time since the end of the Cold War been drastically reduced with serious consequences for climate change research.

In July 1882, the motor-sailing ship "Varna", with a team of Dutch winterers who planned to open a polar station on Dikson Island, departed from Amsterdam. The expedition was led by scientist M. Snellen. In the area of the Kara Gate strait the "Varna" encountered solid ice and drifted into the Kara Sea. There, the ship managed to get close to the Danish schooner "Dymphna", and for a time, they drifted together. In December, due to increasing leaks in the ship's hull, the crew and expedition members moved aboard "Dymphna". In the summer of 1883, during compression of the ice, "Varna" suffered severe damage and sank. The expedition members aboard "Dymphna" reached the coast of Vaygach Island and were later transported to Norway on nearby ships. The results of the expedition made a significant contribution to the implementation of the First International Polar Year program.

In the photo: the ships "Dymphna" and "Varna" during the First International Polar Year, January 1883.

https://commons.wikimedia.org/wiki/File:Ipy-karasea_3.jpg

Arctic collaboration during the 19th century

The search for a sea route through the Arctic Ocean began already in the 16th century, but the search led nowhere, and it was not until the 19th century that scientists showed again an interest in the North. What fascinated them most was their unusual climate and their remote locations. Despite the difficulties to access, first expeditions to the Arctic tended to be launched rather in a spirit of international rivalry than in international collaboration. Often, they served to either mark the European imperialist presence or the reaction against it. However, soon scientists interested in the more extensive phenomena of the physical environment of these regions realized that these individual expeditions were indeed highly ineffective. On the initiative of German lieutenant Carl Weyprecht (1838-1881), the international Meteorological Congress and the International Polar Conference decided in 1879 to organize a Polar Year. It was held throughout 1882-1883, a period during which scientists from 11 countries ran 14 expeditionary stations in the Arctic and the sub-Arctic. The primary aim was to get an overview of geophysical phenomena in these parts of the world for detailed meteorological and earth magnetic pictures by systematic, simultaneous observations. At the time, the scientific results were generally considered as weak, mainly due to the insufficient measurements , as well as because the final analysis of the different observations was not handled centrally but by each country individually, who were not eager to share their national reports. Thus, the scientific research itself was more a work of single nations. Neither in the field, nor in the data analysis or publication work, did scientists from different countries collaborate. What is more, the First International Polar Year did

not end the rivalry between national polar expeditions, but the example shows very well how matters in the Arctic often took place in a tension between cooperation and competition.

Arctic collaboration in the first half of the 20th century

Throughout the first decades of the 20th century, it was only the Soviet Union, that supported robust research programs focusing on the far north: scientists on icebreakers drove through the frozen Arctic Ocean by the mid-1930s, while research expeditions occupied ice islands in the high Arctic and sent back meteorological, oceanographic and ionospheric observations to well-supported institutions further south, including the Arctic and Antarctic Institute in Leningrad. A quarter of the entire territory of the former Soviet Union was located in the Arctic zone, which made it the largest Arctic littoral state. First and foremost, attracted by the economic resources this region could offer, Soviets were interested in the development of the Northern Sea Route and put these large efforts into understanding the physical environment of the Arctic.

In general, Arctic research was conducted on an individual basis, with fragile funding. Most countries did not have many Arctic specialists, and if they did, they visited the Arctic only occasionally. In contrast to the USSR, for instance, the United States governments had largely ignored the Arctic until the outbreak of World War II. However, some still engaged in collaboration, such as the International Society for the Exploration of the Arctic Regions by means of Airship (Aeroarctic), a multinational non-governmental movement largely dominated by German, Russian and American actors, that were motivated by utilitarian as well as scientific interests to explore the Arctic from the air. It was founded by the German officer and aeronaut, Walter Bruns in 1924 and included within the next couple of years 20 members states, that organized, financed and conducted a Zeppelin tour through the Soviet Arctic, to Franz-Josef Land and Severnaya Zemlya in order to survey areas photogrammetrically and to do for example geomagnetic measurements.

Interest in the Arctic kept rising, and researchers as well as governments wanted to obtain more knowledge about its physical environment. Already, while Aeroarctic prepared for the airship flight over the Russian Arctic, some of its members initiated to conduct a Second International Polar Year, that was also to include regions other than the Arctic. The first meeting of the IPY Committee took place in August 1930 in the Soviet Union, that played a major role in this international endeavour due to its strong interests in the Arctic.

Unlike the First Polar Year, where science played a stronger role, the Second Year was much more motivated by practical arguments for new data to construct weather maps for weather forecasting and magnetic maps for wireless radio communication in order to develop commercial routes for aircraft flying over the Arctic icecap. Subsequently, it was also strictly limited to geophysical dimensions, while the First Polar Year included other aspects of natural history such as botany and geology. Despite the financial crisis during the early 1930s, the Second Polar Year was considered as more successful in terms of data obtained due to improved technology and logistics, but also in terms of international collaboration. However, ideological tensions between the USSR and the West were discernible and played out in particular in the exchange of information.

Arctic collaboration during the Cold War

Since the 1940s, Arctic warming had been very pronounced, turning it into a security issue for US and Canadian politicians and thus also for the Nordic countries, who were afraid of a possible Soviet attack in view of easier accessibility as a consequence of sea ice melting. Investigating the Arctic environment had reached an all-time high in the West, and climate change studies were made a top priority for future international collaboration, mainly for military and strategic reasons.

A substantial part of all activity in the Arctic, collaborative or conflict-ridden, was now military-related. Consequently, the nature of collaboration in the Arctic changed tremendously as the world divided into two camps: western countries now felt pushed into military collaboration. Considering the uncertain options for peace and the protection of their sovereignty rights during the early Cold War years, Iceland joined NATO in 1949, and was followed by Norway and Denmark, whose membership placed Greenland within the alliance. It meant that the U.S. used the territory of the northern countries to use their airfields, to operate out of their bases and to even build an air base at Thule in Denmark, which hugely extended the range of U.S. air power.

Meeting of the airship LZ 127 "Graf Zeppelin" with the Soviet icebreaker "Malygin". Painting by Alexander Kircher, 1931.
https://de.wikipedia.org/wiki/Datei:Alexander_Kircher_LZ_127.jpg

Moreover, anxieties of an open polar sea, which, so Canada feared, would have far-reaching effects on its economic and strategic structure forced it to collaborate with the U.S. by exchanging observation data. Beginning in 1954, both countries invested in Distant Early Warning Stations stretching from Alaska across northern Canada into Greenland, intended to warn the U.S. and Canada of an over-the-pole Soviet attack.

The International Geophysical Year 1957-1958

At some later point, in the late 1950s, Cold War tensions also meant that the rivals engaged in collaboration, in order to understand the enemy better, but also to illustrate their superiority. In 1950 several U.S. scientists suggested conducting a follow-up of the Polar Years, but now with a broader focus on geophysical research in general as opposed to only on the arctic.

While Stalin was still alive, the Soviet Union showed no interest in participating, but decided to do so quickly after his death in 1953. A successor of the two preceding Polar Years, the International Geophysical Year (IGY), that took place between 1957 and 1958, meant to mark the end of the period during the Cold War when scientific exchange between East and West was interrupted. Although this time the focus was decidedly on Antarctic research, scientists from 67 countries invested their scholarly efforts towards the Arctic.

European Nations partnered in the Arctic through expeditions, by forming associations, or by installing connected radar installations in different countries. In total, over 40 new research stations were deployed in the Arctic, most of them by the USSR, a few others by Denmark, Canada, Sweden, Finland, US and Poland. On Greenland, a Danish-Swiss-French-West German expedition (Expédition Glaciologique Internationale Au Groenland 1957–60 (E.G.I.G.) conducted collaborative research. Its main objectives were to investigate the mass balance and movement behaviour of the Greenland ice cap.

However, Cold War tensions somewhat limited a number of IGY research programs and Arctic institution-building plans of interest to Soviet scientists, as well as those in North America and Europe. Some projects were halted because either side feared the other would gain too much information. Similarly, agreements on data exchange were not always fully fulfilled. For some countries, such as Norway, participating in the IGY and to conduct research in the Arctic, for instance in Svalbard, was the most effective way to affirm its political neutrality and sovereignty claims. Since the end of World War II, the Arctic had become a military zone, since it was the shortest direct way for rockets between the US and the USSR. Some research stations, such drifting station "North

Drifting research station "North Pole-6", 1957.
https://gcras.ru/rus/history.php

U.S. President Richard Nixon and Chairman of the Presidium of the Supreme Soviet of the USSR Nikolai Podgorny shake hands at a summit in Moscow after signing, among other things, a bilateral Agreement on Cooperation in the Field of Environmental Protection. May 1972.

https://commons.wikimedia.org/wiki/File:President_Richard_Nixon_and_Chairman_Nikolai_Podgorny_shaking_hands_at_the_Moscow_Summit.jpg

Pole - 6" one of the major Arctic stations, for instance, were thus not only build to study the ice but also to provide a military bases. Soviet military combat aircraft needed ice airfields in the Arctic to launch atomic strikes on US territory.

After the IGY, cooperation between the Arctic countries continued to be constrained in the Cold War climate. It was mainly Western countries that collaborated in the arctic, for instance, through NASA's Landsat satellite imagery program that began in 1972. Another project that brought scientists together was ice-core sampling, in particular, on Greenland, where between 1971 and 1981 scientists from the U.S., Denmark, Switzerland and elsewhere for such research. America's interest in the Arctic declined by the mid-1960s, due to the rapid evolution of its weapon system, such as the intercontinental ballistic missiles. But it nevertheless remained present and thus, together with the USSR, upheld the Cold War tensions until the dissolution of the Soviet Union.

Environmental Arctic collaboration since the 1970s

As the tensions of the Cold War were waning, Arctic states have gradually begun to engage in bilateral and multilateral initiatives. Environmental protection seemed to have been the most obvious area to collaborate in, as it was considered one of the least political of all spheres.

By the 1970s, both sides of the Iron Curtain had contributed massively to Arctic pollution. Between 1955 and 1990, the Soviet Union conducted 130 nuclear weapons tests in the atmosphere and near surface ocean of the Novaya Zemlya archipelago, which released around 265 megatons of nuclear energy. In addition, they disposed of sixteen nuclear reactors that were used to power military submarines and the icebreaker Lenin. US research facilities also left considerable amounts of nuclear and diesel waste in the ice. Nuclear waste in the Arctic, however, did not take center stage in international environmental cooperation in the Arctic. Instead, when in 1972, US-President Richard Nixon and the chairman of the Presidium of the Supreme Soviet, Nikolai Podgorny, signed the U.S.-U.S.S.R. Agreement on Environmental Protection, a bilateral project that included eleven working groups focusing on different aspects of environmental protection - working Group 10 focused on arctic and subarctic ecological systems. Its agenda included the prevention or treatment of waste from oil producing industries and liquid waste disposal in permafrost condition, as well as the study of permafrost and arctic ecosystems, including arctic mammals.

In the end, many of the foreseen projects in the Arctic were not realized due to the fear, in particular on the Soviet side, of giving away too much

information. This finally led to a drastic reduction of research in the Arctic within the agreement Instead, other agreements were created to include the Arctic in environmental protection.

As such, the 1973 multilateral Polar Bear Agreement was brought about due to the increased hunting of polar bears during the 1960s and 1970s and prohibited among other thing unregulated sport hunting of polar bears. These efforts to protect the animals and the environment of the Arctic were followed only after the end of the Cold War by the adoption in 1991 of the Arctic Environmental Protection Strategy (AEPS). Finland, that had initiated the creation, argued that intergovernmental cooperation, scientific research and the joint monitoring of the ecosystem will only enable an effective protection of the Arctic. A few years later, in September 1996 in Ottawa this instrument was carried further, and the eight Arctic countries, Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States created the Arctic Council to promote cooperation, coordination, and interaction on environmental protection among Arctic states. A major role in this council was played by the fact that it involved Arctic Indigenous communities, whose livelihood and health depended largely on the response to transboundary contamination in the region — although it was not founded with climate change as a priority, at least since the mid-2000s

"Exceptional" cooperation in the Arctic – and its end

The Arctic council has until recently always served as a model example for peaceful multilateral cooperation in a region that has earlier suffered from militarized tensions between the two superpowers. This model role has even lent to the coinage of the term "Arctic exceptionalism", which remained relevant in describing the situation in the Arctic. And indeed, for almost two decades since then-general secretary of the USSR, Mikhail Gorbachev gave his famous Murmansk speech in October 1987, in which he labelled the Arctic a "zone of peace", for its demilitarization and for more scientific collaboration, cooperation between the Arctic states prevailed. His Murmansk-Initiative marked a long-lasting, influential turning point in Arctic policy, as it helped to reduce military security concerns. The region was considered free of geopolitical tensions.

Consequently, Arctic science could now fully flourish in all directions, on bilateral as well as multilateral levels. A major factor in these developments was played by the creation of the International Arctic Science Committee (IASC) in 1990 by the eight Arctic States, which were soon joined by Germany, France, Japan and the Netherlands, Poland and the UK as full members. The Committee brings together the scientific expertise from all its member states and functions as the organizer of big joint expeditions. For instance, in 2020, it served as the umbrella for MOSAiC, the largest Arctic expedition in history, which involved more than 80 institutions from 20 countries. Apart from such large endeavours, arctic scientists have been involved in a number of other joint experiments and expeditions.

However, the resistance of scientific collaboration became increasingly vulnerable with the events leading up to Russia's full-scale invasion of Ukraine. The first blow came in 2007, when in the framework of the 4th International Polar Year, Russian scientists demonstratively placed the country's flag on the seabed at the North Pole, which signalled Moscow's expansive territorial claims in the Arctic. Russia also resumed the long-range flights over the Arctic Ocean, as were the patrols of the Northern Fleet. As a consequence of Russia's annexation of Crimea in 2014 a growing trend of militarization began in the region – driven primarily by Russia, the USA and China in order to safeguard their own strategic interests.

Five years later, the tensions as well as the impact of the US presidency of Donald Trump left their traces on the Arctic international cooperation networks. The military presence increased from 2015. At the 2019 council meeting, the member states did not, for the first time, adopt a joint final declaration, as members were unable to agree on the content, with the USA in particular opposing the use of the term climate change. Meanwhile, China, Russia and the US were pursuing a multipronged strategy: demonstrating military power while at the same time making use of bilateral and multilateral cooperation. Over the past years, Russia, for instance, has built 475 military sites along its northern border, has reactivated 50 Soviet outposts, and equipped its northern fleet with nuclear and conventional missiles.

The Arctic cooperation among western countries and Russia ceased to exist with the unprovoked Russian invasion of Ukraine in February 2022. Less than a week later, the Arctic Council nations halted collaboration with Russia, who was at that point halfway through its two-year tenure as the body's rotating chair. As a consequence, all meetings of the council and its working groups were paused and only resumed when Norway took over the chair in May 2023. Scientific collaborations and data

Russia is expanding oil and gas production with financial help from investors from China and the BRICS countries.

In the photo: Sabetta, Yamalo-Nenets Autonomous region, Russia, March 30, 2021. The gas carrier "Vladimir Vize" is loaded with liquefied natural gas at the pier.

https://www.shutterstock.com/ru/image-photo/sabetta-tyumen-region-russia-march-30-1986626375

exchange that involved Russia have been halted. However, although the US has been pushing to exempt Russia from international forums, including the U.N. human rights body and the international aviation agency and even suggested kicking out Russia of the Group of 20 major economies, or G20, it is now working to re-establish ties to Russia within the Council in order to not lose Russian climatological data.

While the Arctic Council is weakened, other collaborations are emerging in the Arctic - with countries that are not located near the Arctic, but that have a strategic interest. Turning away from western countries, Russia invited China in March 2023 to create a joint working body to develop the Northern Sea Route, which connects the eastern and western parts of the Arctic Ocean. A month later, the Russian Federal Security Service (FSB) and the Chinese Coast Guard signed a memorandum of understanding on maritime law enforcement cooperation, which demonstrates the seriousness of Russian-Chinese cooperation in soft security spheres. At the same time, the government-owned Russian coal mining enterprise, Arktikugol, has publicized its plans to develop an international Arctic science station on Svalbard in collaboration with the partners of BRICS, an association of countries that have formed closer ties to each other in the shadow of the war.

Under the new conditions of collaboration, it is clear, that Russia is even increasing its strong focus on economic development in the region. While the European Union has committed to keeping Arctic oil and gas in the ground, Russia is expanding its operations – with the financial help of investors from China and the BRICS countries. As such, the Arctic has no longer a common goal for the mitigation of climate change and the region has entered yet another stage of environmental and political uncertainty with far-reaching consequences for the rest of the planet.

Indigenous peoples of the Arctic:

environmental protection in isolation

How the war affected the indigenous peoples of the Arctic and their rights to a favorable habitat

BY VERA KUZMINA

Since Russia invaded Ukraine in 2022, it has continued its attempts to develop Arctic territories. The main spheres are defense, mineral extraction and intensifying shipping on the Northern Sea Route. However, Russia's polar regions are also home to several dozen groups of indigenous peoples.

What does the withdrawal of international environmental organizations from Russia mean for them, how do the authorities observe the rights of indigenous people, and what new threats do they face during wartime? Bellona talked to the first political refugee among the indigenous peoples of Russia, Dmitry Berezhkov, an Itelmen), and the only foreign agent among indigenous peoples, Pavol Sulyandziga, an Udege.

The main threat is enlistment in the war

The indigenous peoples of the North, Siberia and Far East of Russia make up 40 different ethnic groups. They inhabit approximately two thirds of the area of the Russian Federation, and number around 300,000 people altogether.

According to Berezhkov, among indigenous people the percentage of those who have been drafted into the Russian military is higher than it is for Russia's largest ethnic groups. For example, from the village of Gvasyugi in the Khabarovsk Krai, which is primarily inhabited by the Udege, 14 people were sent to the frontline. This is a small figure in absolute terms, but the village has a population of just 200 people, and 14 people represent 30% of the entire mobilization resource. Six representatives of the Saami people have also been reported killed in the war – but the total population of the Saami is just 1,500 people.

Berezhkov also gives an example of Yakut hunters being mobilized in Yakutia in 2022. Priority was given to mobilizing people listed as employed, and village administrations submitted lists of the unemployed to recruitment offices. This was not expected to have a strong impact on village economies. However, among indigenous peoples it is usually the men who take part in traditional activities such as hunting, but they are still included on the lists of the unemployed.

"We do not connect this with the ethnic component. It is primarily because of the poverty and lack of education and knowledge among the local population," Berezhkov says.

According to data from the International Committee of the Indigenous Peoples of Russia, since the beginning of the war around 300 representatives of these peoples have been killed in Ukraine. The death of each person means a decrease in the possibility of survival for indigenous peoples, as well as in the possibility of protecting the environment from economic exploitation, and maintaining the traditional ways of interacting with the environment.

At the same time, the Russian Association of indigenous peoples of the North, Siberia and the Far East, which is controlled by the government, wrote an open letter accusing activists from the indigenous peoples who left the country of discrediting the Russian army, and called for their arguments to be ignored.

The withdrawal of WWF and Greenpeace

After the war began, the World Wildlife Fund (WWF) and Greenpeace were declared undesirable organizations in Russia, which received wide media coverage. It should be noted the Russian office of the WWF was practically a separate legal entity, which was declared to be a foreign agent. However, the undesirable status practically put an end to the work of the Russian branch of the WWF, as the organization's logo and other elements of the brand were prohibited.

https://www.shutterstock.com/ru/image-photo/beautiful-house-indigenous-people-siberia-artistic-1341793067

In the case of the WWF, the organization came under fire after a statement by parliamentarians in Chukotka that the fund's activity "influenced the defense capability of the country and hindered development of the Northern Sea Route".

The Russian office of the WWF developed a network of protected natural territories in the Murmansk Oblast and the Nenets autonomous district and other regions. The total area of the planned territories was to come to 200,000 hectares. The interests of the indigenous peoples were not always properly observed, Berezhkov suggests, but there is a national park which ensured that the indigenous people were given rights and opportunities.

With the creation of the Bikin national park in 2015, the natural boundaries of the Amur tiger in the Sikhote-Alina hills and the interests of the indigenous peoples were taken into account. This is one of the few examples in Russia when interested parties sat down at the negotiation table, discussed their positions and reached an agreement. Dmitry Berezhkov believes that the project was a success in part thanks to the direct support of Vladimir Putin. "He likes big cats and gave an order to create a national park. After long consultations it was possible to ensure that indigenous people would have access to the territory, and that the tigers would be protected," says Berezhkov.

The Russian office of Greenpeace also worked in Arctic regions, though not as on such as a systematic basis as the WWF. However, Greenpeace paid more attention to conflict situations with the authorities, Berezhkov notes.

"Employees and volunteers came to the site of an incident (oil spill, pollution) made videos and raised awareness. This is work that the indigenous peoples find difficult: they don't have the necessary equipment, skills and time".

"Greenpeace was the only major expert organization that was able to get to Taymyr after an oil spill of 20,000 tons of oil products at Nornikel. They gained the support of the deputy Mitrokhin, and helped journalists from Novaya Gazeta [Yelena Kostyuchenko – ed.] to get to the site. If it hadn't been for Greenpeace, there would not have been such wide publicity. The government, Rosprirodnadzor [The Russian Federal Service for Supervision of Natural Resources] and Nornikel would have decided quietly among themselves who would pay, and how much," says Berezhkov.

Greenpeace also ensured wide publicity for the confrontation between the ethnic Khant Sergei Kechimov and the Surgutneftegaz company. Kechimov took the company to court over rights to a pasture near Lake Ilmor, where the company planned to drill for oil. Kechimov's next court hearing will be held in September.

"There are dozens of cases like Sergei Kechimov's around the country, when indigenous people are forced off their land and mining companies move in. No one takes any notice of these cases and tries to ignore them. Things happened differently with Sergei Kechimov.

Oil spill near Usinsk and Ust-Usa, Komi Republic, August 28, 2014.
Photo: Greenpeace

https://commons.wikimedia.org/wiki/File:Komi_Oil_Spill,_near_Usinsk_and_Ust-Usa.jpg

Greenpeace came and made a film and drew the media's attention to the case. But after the war began and Greenpeace left Russia, Sergei Kechimov's trial vanished from the media's agenda," says Berezhkov.

The environment and indigenous people's rights are now taken care of by pro-governmental organizations

Since 2012-2013 the government has been working to force independent environmentalists and organizations of indigenous peoples out of the country.

"Today the environment in the Arctic is protected by pro-governmental environmentalists on the Kremlin's instructions. These organizations mainly focus on propaganda and PR. They do not do any systematic work," says Berezhkov.

He adds that to change the system requires political influence, and this is non-existent. "The only thing that is left is to tidy up litter, and this is not the same as standing up for rights or fighting for the environment. Decisions taken at political level have importance and weight, but tidying up litter on a beach does not (there'll be litter on the beach again tomorrow unless a regulatory decision is taken)".

"The remaining environmental organizations do not come to the assistance of local residents if there is a conflict of interests. They always stay on the sidelines, or on the side of the authorities. There are no systematic activities, no clear campaigns, only attempts to clean something up if pollution has taken place," says Berezhkov.

Berezhkov believes that the system for protecting the rights of indigenous people or the environment has been destroyed in Russia. 20 years ago, local residents who were angered by the actions of businesses or the government found support from opposition parties.

"The coordinated efforts of environmental activists and political parties drew the Kremlin's attention. As a result, the activists were forced out of the country, support from the international community was suppressed, those who remained were intimidated, and opposition parties and independent media were destroyed. If there is no opposition, there are no protests by the population or any local conservation initiatives," Berezhkov says.

Today, the interests of indigenous peoples are represented by the Association of indigenous peoples of the North, Siberia and Far East (RAIPON), and its head is the senator of the Yamal-Nenets autonomous district Grigory Ledkov. Pavel Sulyandziga says that RAIPON cannot be considered a legitimate representative of indigenous peoples.

"If the problem isn't critical, there will be some discussion, but if industrial projects and business are concerned, then it is practically impossible to express an objection," says Berezhkov.

"Since the war began the situation has only got worse. Drawing attention to the environment is practically equivalent to sabotaging military operations and hindering the economy, and carries the risk of imprisonment, so no one objects."

As Pavel Sulyandziga says, before the war began it was possible to fight for the rights of indigenous people, but now all local communities can hope is "that companies or the state may at least give them something – otherwise you could end up in jail".

As an alternative to RAIPON, in 2022 members of indigenous peoples who left the country created the International Committee of Indigenous Peoples of Russia. "It officially includes only members of indigenous peoples who are out of danger. We try to overcome the veil of silence," says Berezhkov.

New environmental threats

Russia has become more active in the Arctic recently, developing the Northern Sea Route and the raw materials base. In the Murmansk Oblast, Rosatom and Nornikel have acquired sites for mining rare earth metals, including lithium.

Additionally, projects have been initiated in the Murmansk and Kemerovo Oblasts to produce lithium, also under the protection of Rosatom. Lithium will be used at Rosatom plants to manufacture car engines, with the first plant due to be opened in Kaliningrad.

"Realization of these projects is proceeding very fast, no one is thinking about the environment. There are only statements that consultations were held with indigenous people about these developments, but there were in fact no such consultations," says Berezhkov

Berezhkov also mentions the continuation of the Vostok Oil project on Taymyr. Its development will increase the cargo flow by many times on the Northern Sea Route, and this may also cause a rise in pollution.

Another trouble spot is the copper field Peschanka on Chukotka, where production is carried out by Trianon Limited, a company from Kazakhstan. The field was originally _ by the major Kazakhstan holding KAZ Minerals, but in 2023 it sold the shares to the affiliated Trianon Limited.

The Russian authorities persuaded the owners of Peschanka to invest in Rosatom and purchase small floating NPPs, which will provide electricity to the field. In June 2022, the Rosatom structure Chukotkatomenergo began to build a marine terminal with four floating power units to provide power to the Baimsky mining and processing combine, with a total capacity of 318 MW.

No battle, no complaints

Another example of an unsuccessful protest was seen on Chukotka. This involved building a new port in the Bilibin region of the Chukotka autonomous district. The authorities decided to build the port in a new location, rather than developing the already existing port of Pevek. "The decision was made to benefit business, without consulting local residents. But the indigenous peoples do not need a new port. It will destroy the existing way of life for fishermen and reindeer-breeders," says Sulyandziga.

Formally, the government is allocating money to building another terminal for the Pevek port, but in reality this is a new port 50 kilometers from the old one, on Cape Naglyoiny. 27.5 billion rubles have been allocated from the budget for its construction.

Sulyandziga says that initially the indigenous people tried to defend their interests as construction on the port began. "Indigenous peoples contacted me and a number of foreign organizations concerning the construction of the new port," he says.

"But after the first meeting was held on Zoom, the FSB began directly threatening people. An unprecedented troop of officials flew into the community, promising them "mountains of gold", but there are no official documents concerning this."

"After a while I received a report that they were stopping the fight, because they were scared for their lives. People at least used to try to object, but now the authorities have shifted to using threats and terror. Their hands are untied, and the war can be used to justify everything," says Pavel Sulyandziga.

The indigenous peoples of the Khanty-Mansiisk Autonomous district, where Sergei Kechimov protested, were also deprived of the right to express their opinion openly in 2023, when meetings and assemblies on protected areas were banned in the region. This also entails a ban on holding rituals which indigenous peoples use to express their opinions and show the importance of natural territories. The ban was introduced when local residents protested against drilling for oil in areas where they grazed reindeer or gathered the harvest from the forest.

Additionally, the practice of making complaints and statements to supervising bodies – Rosprirodnadzor and the environmental prosecutor's office – has practically become pointless. In 2022, the Russian government placed a moratorium on inspecting businesses, following a presidential order. This means that if citizens now file a complaint on violations of environmental legislation, they receive a refusal to make an inspection, because of the moratorium.

Peoples separated by borders have it worst of all

After the war began, international cooperation stopped, and even ongoing projects were suspended. This has had a devastating impact on the Saami and Inuit, Sulyandziga says.

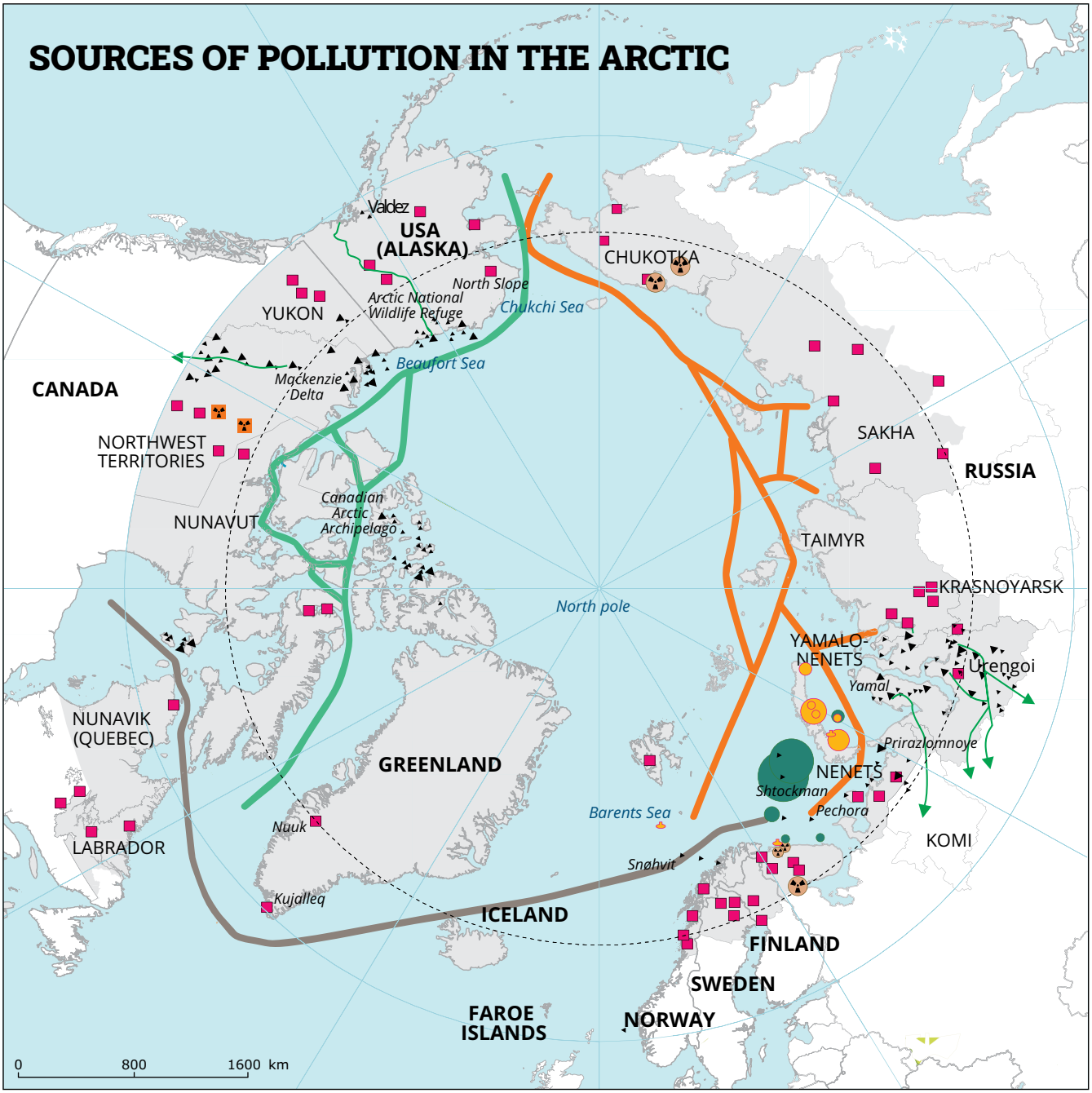
"These peoples have relatives in other countries, and now they cannot meet. Ongoing projects have been suspended. For example, the project for a network to observe climate change, for climatic adaptation and safety. This project was realized in the Bering Strait region and concerned issues of preserving biodiversity. Another project to assess black carbon emissions and their impact on public health was also suspended," Sulyandziga adds.

But unlike Soviet times, these days people are able to stay in touch and send each other information.

"Formally the isolation is the same, but no one can prevent the spread of information like they did in the Soviet Union. There is communication and people can stay in touch. This may not result in cooperation, but communication does exist," says Sulyandziga.

Inuit houses in Aasiaat, Greenland.

https://www.shutterstock.com/ru/image-photo/multiple-colorful-inuit-houses-cottages-on-1500937166


SOURCES OF POLLUTION IN THE ARCTIC
Valdez
USA (ALASKA)
CHUKOTKA
North Slope
Arctic National Wildlife Refuge
Chukchi Sea
YUKON
Beaufort Sea
Mackenzie Delta
CANADA
NORTHWEST TERRITORIES
SAKHA
RUSSIA
Canadian Arctic Archipelago
NUNAVUT
TAIMYR
KRASNOYARSK
North pole
YAMALO-NENETS
Urengoi
Yamal
NUNAVIK (QUEBEC)
GREENLAND
Prirazlomnoye
NENETS
Shtockman
Pechora
Barents Sea
KOMI
Nuuk
LABRADOR
Snøhvit
Kujalleq
ICELAND
FINLAND
SWEDEN
FAROE ISLANDS
NORWAY
0
800
1600 km
Arctic circle
National/regional boundaries
Arctic region defined as in Arctic Human Development report
Oil, gas and mining
Oil and gas exploration and production sites
Main mining sites
Main existing gas and oil pipeline
Nuclear power plants and other nuclear facilities
Uranium mining
Nuclear waste
Liquid discharge points radioactive waste
Buried or flooded solid radioactive waste
Sea routes
Northwest Passage
Northern Sea Route
Arctic Bridge