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SOCIAL AND ECONOMIC DEVELOPMENT

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Tourism in the Subarctic and the Baltic Sea regions of Europe*

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Abstract. It is argued that the cultural dimensions of the Arctic and Subarctic have much to offer contemporary tourism, both as sources of new contents in tours and as an important field in tourism research and management training. In Norway, the Euroarctic is marketed to tourists focusing on nature and wildlife. A limited set of branding elements is used: northern lights, ice hotels, dogsledding, “safaris” for watching: whales, rare birds, and for catching king crabs. Wildlife, like the weather, is unreliable, and disappointed tourists are bad for business, so cultural contents have in practice proved necessary to bring into guide narratives as “backup entertainment” on no-shows of the natural attraction. Much more of the ethnological and historic heritage of the Euroarctic has potential interest to regional tourism development. This article compares tourism in the Euroarctic with that of the southeast Baltic Sea region, to find examples of what this could be and makes some recommendations based on that.

Keywords: Norway, Russia, subarctic tourism, cultural heritage, collective memory, borderland, Curonian Spit, Klaipeda.

Introduction

According to most definitions, the European Subarctic includes the northernmost counties/oblasts of Norway, Sweden, Finland and Russia west of the Urals. Northwest Russian tourism is often routed via Moscow or Saint Petersburg and managed by tourist operators there and in Arkhangelsk or Murmansk. Bus tours and cruises in these regions sometimes connect to destinations in the adjacent southern Republics of Komi and Karelia. Taken together this “north” largely coincides with the Nordic-Russian socio-political partnership, launched in 1993, called the Barents Euroarctic Region.

Today tourism in northern Norway is in a period of growth. In Finland, subarctic tourism has been of significant economic importance for several decades thanks to a concerted effort combining cutting-edge academic knowledge of tourism with hospitality talent and entrepreneurship, all supported by visionary investors. Helped by international media attention in the last decade, the initially home oriented fleet of passenger and goods transport ships of the Hurtigruten line in Norway has been developed into a combination of a route-based transport enterprise and cruising tourism operator. The latter business is by far the important one today. On their route from Bergen to Kirkenes and back the fourteen ships of the Hurtigruten make calls at several harbor towns and villages. Local tourist operators offer short excursions during these stops, which are up to a few hours in length.

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Many of these local tourist attractions are marketed as nature-based. But international scholarship has demonstrated these to be constituted by culture in the sense that fascination with “wild” or exotic nature and traditional ways of living in remote corners of the world, is part of western popular curiosity about the north propagated since the nineteenth century in travelogues of west and central European travelers [1, Wråkberg U.]. There is nothing necessarily outdated or problematic in this interest which a tourism business could not handle and cater to in a modern ethical way, but to do that takes some professionalism. The concern over global warming, as one of its admittedly minor effects, blends in with the idea of the Arctic as exotic. It has made winter itself seem destined towards extinction and worth experiencing before it retreats beyond reach to any but the most affluent tourists.

The main issue at stake in Norway is one of striking a reasonable balance in strategies for the tourism sector between economic, cultural and environmental goals. In steering documents issued by the Norwegian government priority is given to sustainable, high-end, out-door and nature-based tourism¹. Combining this with neoliberal outlooks on university education, which favor short and practical vocational trainings, cultural aspects tend to be less emphasized in tourism management courses.

Northern Scandinavia and the adjacent part of Russia form a cross-border region with an interesting history. It has traits in common with the crossroads in Central and Eastern Europe. This provides reason to look for similarities and differences in cultural traditions at the center of Europe and in its north, and to consider their possible implication for heritage site management and tourism development. One feature in common that is seldom mentioned is the religious border zone between the Russian Orthodox and the Evangelical or Catholic Churches, which are found in central Europe as well as in the north. This aspect of culture is significant in the contemporary life of local citizens and in local heritage management, and thus of interest to tourism operators [2, Kristiansen R.E., Egeberg E.; 3, Sorokina M.].

Recent scholarship on Eastern Europe has raised general issues which are useful to be aware of in studying the Euroarctic and its border regions. Central European historians have demonstrated how so-called collective memory is formed and used and have pointed to a need to speak about different “writings of history” on many subjects, several of which are of importance to tourism management [4, Erll A.; 5, Tamm M.].

By comparing tourism on the coast of the south-eastern Baltic Sea with tourism in Northern Norway and its borderland with Russia, the field research for this report aimed to establish similarities and differences that can guide improvements in Euroarctic tourism. Both the content of northern tourist tours and the design of tourism management education at Arctic universities can benefit from the findings of this study. The ways to balance nature and culture attractions in

¹ Norwegian Ministry of Trade, Industry and Fisheries. Regjeringens reiselivsstrategi: Destinasjon Norge – Nasjonal strategi for reiselivsnæringen [Governmental strategy for tourism: Destination Norway – National strategy for the tourism industry]. 2012. URL: <https://www.regjeringen.no/no/dokumenter/destinasjon-norge/id677870/> (Accessed: 3 August 2018) [in Norwegian].

place branding will be explored, as well as how the right balance can be found between the interests of tourists to visits national parks and the scientific interest to keep nature parks closed to protect their nature. The conclusions on this will be presented at the end of this article².

Tourism on the Curonian Spit

The Curonian Spit is an elongated, slightly curved peninsula, a narrow extension of land some 100km in length with a width varying from 4km down to 400 metres at its most narrow point near the village of Lesnoye. It runs in an SSW-NNE direction and is part of the coast of the south-eastern corner of the Baltic Sea. To the east, it encloses the Curonian Lagoon, which opens to the Baltic Sea by a narrow sound at its northern end near the Lithuanian port of Klaipėda. The Spit consists mainly of sand and sand dunes, all mostly bound by pinewoods and other vegetation. It has been the object of public governance policies since the 19th century aimed at nature conservation by systematic land-management. Interestingly, the earliest policies also included instructions on the preservation of cultural heritage in the styles and building traditions of the (then still important) fishing hamlets on the Spit. The region was granted World Heritage status in 2000. Its territory is divided roughly in half by the national border of the Republic of Lithuania and its 54 km northern section, and the Russian Federation enclave of Kaliningradskaya Oblast in the south.

Based on field-studies in Smiltynė, at the northern end of the Curonian Spit, and in Klaipėda the present author has discussed in more detail elsewhere the Klaipėda / Memel cityscape of cultural and socioeconomic layers, including its lacunas and contested sites [6, Wråkberg U.; 7, Kinossian N., Wråkberg U.]. The tourist industry of the Curonian Spit provides striking examples of the fact that some tourists bring a heritage to a site based on their own background and interests. In Klaipėda, and on the Spit, many people of Jewish, German and Russian culture visit areas related to their own family's histories, significant of their traditions. This has partly been discussed in recent academic research [8, Peleikis A.], but is not a theme in local tourist guides. Nevertheless, representatives of the relevant groups are visible on websites internationally. After five decades as part of the USSR the Soviet heritage is of course still visible in much of Lithuanian and Kaliningrad infrastructure. It is interpreted in different ways by various visitors and residents [6, Wråkberg U.]; about 6% of Lithuania's citizens are Polish speaking today, and about as many are of Russian / Soviet origin.

Based on what archaeology can tell about this part of Europe, an open-air Viking village "Ancient Sambia" was opened to tourists in April 2014 in the Kaliningrad region and soon became a success [9, Belova A.V., Kropinova E.G.]. Even if we set the scope to what written sources can tell us about this part of the Baltic these speak of a multi-ethnic and shifting history. The Curonian Spit and its lagoon have formed a crossroad of communication, tying routes inland to Belorussia, Poland and Lithuania, to shipping along the coast to towns and regions on the Baltic Sea, and for ex-

² An unrevised version of this presentation, combining its research with that of other projects, has appeared as a working paper issued by the Research Centre of the Slovak Foreign Policy Association, Bratislava.

port further away, via the sound between Denmark and Sweden and the Atlantic Ocean. The area has been under the sovereignty of Prussia, Imperial Russia, the Soviet Union, and a part of Lithuania, to mention only the most long-lasting regimes.

The Second World War brought devastation to this part of Europe as the frontier of war and occupations, by the Red Army and that of Nazi Germany, passed across this territory several times. The result was streams of refugees, genocide of the Jewish population, devastation of infrastructure, estates and traditions. This created bitter memories and many different histories to be told, listened to, acknowledged and mourned. At the end of the war, the German population had fled, or was deported, from Memel / Klaipėda and all former East Prussia and the Baltic states. Lithuania and its part of the Curonian Spit was made a Socialist Republic of the Soviet Union and remained as such until its reconstitution as a sovereign state in 1990 [10, Kirby D.; 11, Kasekamp A.; 12, Snyder T.; 13, Eidintas A.]. Thus, this region contains, or rather consists of, a complex material and symbolic heritage, rich in border imagery and symbolism. It presents many challenges to contemporary regional and city managers in terms of what sites to demolish and redevelop, what to maintain and restore, and what histories to mention in tourism information, and for operators to thematise in tour guides, and in branding and marketing [14, Mačiulis D., Nikžentaitis A., Saffronovas V.].

Professional cultural studies of the Baltic Region and in central Europe seem to indicate that cultural heritage managers and successful tourism developers alike do best in applying a kind of archaeological approach to local and regional history to get all layers in the cultural landscape visible [15, Huyssen A.]. Priorities are needed for marketing, yet a rich cultural heritage could be key in building prolonged fascination among visitors for a site or a region, making tourists keen to return. Good scholarship and ethical standards call for awareness of differences of interests among present and former residents of a region, as also among its visitors. Of course, heritage management resources are limited, and capital investors are major movers of developments in most places. City planners need to arrive at manageable projects, tourism outreach will have to be based on some choices on what restrictions to impose on altering historic estates, and on how much to spend on renovations of the built heritage, to keep different periods of the past visible [this is further elaborated in 16, Sirutavičius M.]. Preserving historic environments may pay-off in increased tourism appeal.

Comparing tourism management in central and northern Europe

There are some similarities to be found in the developments around 1945 in central and in subarctic Europe. Northern Finland and the Murmansk Region in Russia were theatres of war. The scorched earth tactics and systematic demolition “programme” practiced by the retreating German army as it moved north and west in 1944-45, out of engagement with the Finnish and Red Armies, resulted in a devastation of infrastructure and housing in northern Norway which was among the worst in Europe in material terms [17, Lund D.H.]. The forces of the Soviet Union that

in October 1944 liberated, and then occupied, the easternmost part of Finnmark were ordered back to Russia in the autumn of 1945. Some demographic change of the war became permanent also in the Euroarctic: required movements of small populations took place, foremost in the high north was the evacuation of the Finnish and East Sámi population out of the pre-war Finnish territory of Pechenga, close to the border with Norway. This process is seldom mentioned today and is mainly invisible to tourists, one exception being its presentation in the exhibitions of the Siida national museum of the Sámi indigenous people in the Finnish town of Inari³.

The standardised monotony of the housing that was built in Finnmark County to replace what had been lost in the war was the result of a governmental policy imposed on the entire re-building process. It ignored Sami traditions as well as any other local pre-war heritage in its prescribed modernistic village layouts and in the style of the housing. The re-building scheme was based on national Norwegian subsidies, which were per se economically both necessary and welcome in northern Norway. Nevertheless, this “reconstruction” was a continuation of the pre-war “Norwegianization” policy on North-Eastern Norway [18, Wråkberg U.]. A succession of Norwegian governments in Oslo regarded its borderland, with its age-old cultural and ethnic crossroads with Finland and Russia, as in need of a more pronounced Norwegian character [19, Eriksen K.E., Niemi E.; 20, Hønneland G.].

Today, the poor and anonymous character of the housing built in Finnmark County in the post-war decades is sometimes discussed locally, but it has never been officially acknowledged. No revival of Finnmark built cultural heritage has been suggested as part of public policy, nor has it been undertaken to date. This stands in contrast to lively debates on city planning regarding most other places devastated by the war in Europe [see e.g. 21, Diefendorf J.M.]. It partly explains the lack of interest, on behalf of the present owners of this post-war real estate, to invest in its maintenance. Its resulting poor state of maintenance, and the fact that it is centrally situated in most Finnmark villages, worsens its humdrum impact. It is often commented negatively upon by visitors, and thus it hampers local tourism⁴.

A transfer of experiences and insights in the opposite direction, from the borderland of subarctic Europe to that of the Curonian Spit, may be of interest while discussing best practices in managing nature reserves, especially such as those that straddle national borders. In northern Scandinavia and northwest Russia, there are several long established national parks. One of these is situated across, and on both sides of, the Pasvik River, which defines the national border between Norway-Russia. Local citizens’ experiences of national parks are profound given that the Euroarctic is endowed with several of them and some are large, such as the Urho Kekkonen National Park in northernmost Finland which by its 2,500 square km is fourteen times the area of the national park on the Curonian Spit. Outdoor recreation is a big interest among those living in

³ Siida Sami Museum. From Petsamo to Inari, 2003. URL: <http://www.samimuseum.fi/saamjiellem/english/historia.html> (Accessed: 3 August 2016).

⁴ Andreassen R.F. Byen Turistene Velger å Overse [The Town Tourists Choose to Overlook]. *Sør-Varanger Avis*, [a local Kirkenes newspaper] 27 June 2015, p. 6.

northern Fennoscandia and north-west Russia. In Norway conflicts between different ideas on how land should be used or protected are frequently expressed at on-line forums and in local newspapers. In general, those regarding nature / national parks are about finding the balance between any park's role as a recreational area and as an exclusive sanctuary for nature. Emphasising the latter, the park may have its access limited to park rangers and natural scientists. Residents with outdoor recreation as a hobby or part of their informal economy, and tour operators' and their customers, will lobby against this — if there are any left one might need to add in the sparsely-populated north.

Does the scientific / scholarly hybrid research approach of “radical human ecology” provide us with a way forward in analysing conflicts of this kind? This seems doubtful deeming from what Ullrich Kockel has to say in this tradition on the different ways land uses and heritage preservation on the Curonian Spit and its World Heritage park have been handled, comparing the Kaliningrad management of the Russian part with its Lithuania counterpart, in his 2012 article on the matter [22]. Matching Kockel's exposition against the job and income generating examples of tourism developments on the Curonian Spit presented by Belova and Kropinova [9] the latter scholars have more in common with the political majority in Norway today than what Kockel has. They illustrate the need for a less elitist and more business-minded view on how to set the balance between access and protection of nature parks.

Kockel's application of radical human ecology on the cultural heritage of the Curonian Spit also fails to discuss some apparent problems. He does not find anything problematic in the imbalance in purchasing power between most other actors and the “returning” German tourists who visit this coastal region with or without a family background on the land. In obvious contrast to most other stakeholders involved, the latter possess the financial means to buy historic real estate, and thus can articulate their local interests very well. They are equalled only by Russian investors. The latter are, despite the fact of the Russian jurisdiction on the southern end of the peninsula, disregarded in Kockel's treatise as too commercial and somehow in general unable to manage the region's heritage properly. In this kind of perspective, any plans to build new tourism establishments on the Curonian Spit that invite large groups of visitors should be avoided.

Tourism and cultural heritage in the Russo-Scandinavian Subarctic

Local debates regarding land uses and tourism are intense in northern Norway. Consensus is however seldom reached locally, so the final decisions on these matters tend to come from the government ministries in the national capital Oslo. Proposed liberalisations like that of opening new areas for off-road snowmobile driving, are debated in northern newspapers and on Facebook pages, as well as among the parties in the Norwegian parliament⁵. Public governance presently

⁵ See for example the local news article: A. Renslo-Sandvik. Vurderer fartsgrense på 30 km/t, rasteforbud og påskestengt: Ser flere potensielle løype konflikter [(The municipality) considers setting the speed limit to 30 km/h, prohibiting stops, and to close (areas for snowmobiles) over Easter due to all potential conflicts over trails]. *Finnmarken*, 20 August 2016, pp. 4–6. An example on party conflicts on this issue in the Norwegian parliament is found in: O.G. On-

tends to favour tourism business' interests to open routes to their customers over the interests of nature preservationists. It is not uncommon in northern Scandinavia for residents to go against expanding nature parks because such enlargements are known to produce few local jobs and limits income possibilities for tourist operators.

Based on the present author's experience of work as an on-board guide on a handful of Arctic cruises, most tourists are curious and fascinated about many things. Few have only one hobby or interest that motivated them to join the trip and would not like to be distracted by any other kind of perspectives or anecdotes about the north. Nevertheless, the nature focussed scope of the content of subarctic tourism in Norway has caused short vocational kind of tourism management trainings to be favoured over a broader university course package. The latter typically not only prepares for running small business operations in the Subarctic, but also provides general insights in public history, cultural heritage management, museum curatorship and thus opens for a professional career in tourism related work outside of the high north. To the often-stated need for ecological sustainability in northern tourism should be added a component of cultural sustainability in the ethical sense approached in this article. This is corroborated by experiences reported from nature-culture tourism globally [23, McKercher B., Du Cros H.; 24, Gillman D.; 25, Graham B., Ashworth G.J., Tunbridge J.E.].

There are also practical reasons to keep cultural and heritage study central in the scope of course programmes of northern tourism management, which derive from a focus on natural phenomena. Many of these, which are high on the wish-list of tourists, are elusive and unreliable occurrences, such as the Aurora Borealis, or the objects for bird and whale watching. All operators of such tours know this already and have a "plan B" for the tourists when there is a "no-show" of the desired nature marvel. Such alternative tour content needs of course to hold good quality, i.e. be based on up-to-date science and scholarship. Here joint projects and course programs for tourist guides run in partnership with the university sector can contribute to make tourism contents more reliable, rich and fascinating.

The idea of finding genuine rurality and traditional culture in some forgotten corner of Europe, including in its remote subarctic part, continues to drive some visitors towards parts of central and northernmost Europe. This is important in some tourism markets and could be catered for in a sustainable way in terms of ecology, minorities' interests and up-to-date interpretations of culture heritage. A more recent "attraction" of Arctic nature is that it may fall victim to environmental degradation. This attract a few people to the north by so-called dark tourism. In the Euroarctic post-Soviet industrial sites and mines in the Russian borderland with northern Norway and Finland are monument of what humans must not do to nature, and on Svalbard the industrial heritage is seen as reminders of an environmentally destructive business that should never had been

søien, Bengt Rune Strifeldt (FrP) ville gjøre det lettere å få skuterdisp [B.R. Strifeldt, parliamentarian for the FrP party, wishes to make it easier for municipalities to issue dispensation from the law restricting off-road driving with snow scooters and other vehicles]. *Finnmarken*, 13 June 2018, pp. 6–7.

started [on dark tourism see 26, Sharpley R., Stone P.]. The visitors who come to marvel over the dark attraction of mining in Kirkenes and Nikel may however, in locally guided-tours, find their way to municipality and mining museums in e.g. Pechenga and Kirovsk. At these are told a more nuanced history of the old Soviet period. In its later periods it provided a relatively well-paid and stable family life up-north for its labourers. It is often news to the foreign visitor to learn that employment in this industry is still the main alternative to make a living in subarctic Russia for those remaining there after massive out-migration since the 1990s. Properly guided such museum and site visits can turn into profoundly interesting experiences for the open-minded tourist [27, Haugseth P., Wråkberg U.].

Certain institutional features of northern tourism in Fennoscandia and north-west Russia are interesting to compare with the situation on the coast of the south-east Baltic Sea. The cooperation within the Barents Euroarctic Region has continued since its beginnings in the 1990s and functions as a platform for cultural and scholarly partnerships among its member countries [28, Haugseth P.; 29, Tjelmeland H.]. Tourism development has been part of this. The Baltic Sea region has access to a more general European Union funding framework, while regional collaboration has often consisted in city-to-city cross-border partnerships and been successful to the extent that the towns themselves have been able to muster interest and raise funding locally to keep these going.

Until the first decade of the 20th century, popular international interests for the Arctic were focussed on the attainment of the North Pole. In the early decades of the Cold War a cross-Pole military frontiers were envisioned and Arctic war-scenarios a constant preoccupation [30, Doel R.E., Friedman R.M., Lajus J., Sörlin S., Wråkberg U.]. From an historical perspective, and in contrast to the voluntary partnerships of the Baltic Sea and in the Barents Euroarctic Region, the global industry frontier conception of the Subarctic has seen its contact zones as politically unimportant beside the need of settling their geographic position and their legal status as just borders. The global outlook on the Arctic is mentioned here because it fascinates many northern tourists today and ought to be part of the repertoire of subjects that all well-trained northern tourist guides can inform about.

A complementary way of viewing the European high north would be to see it as a cross-road, effective over a long period of time, as part of the large European-Asian cultural nexus. The Subarctic has been a small part in this transfer-zone of ideas and migrations from east to west, as well as between north and south. This is another example of what is motivated to make known to persons interested in the high north, including its tourists [cf. 31, Doel R.E, Wråkberg U., Zeller S.].

The Arctic islands of Svalbard, where some 2,500 people live today were once a *terra communis* but have belonged to Norway and since 1920 were managed under the principles of the Spitsbergen Treaty. The largest groups of nationals residing on the islands are presently Norwegians, Russians and Ukrainians. It is governed under the special Spitsbergen treaty, which opens for business activities, including tourism, on the islands to entrepreneurs from all signatory nations on an equal opportunity basis. Here day-trip cruises to an abandoned Soviet mining ghost town

called Pyramiden draw large numbers of visitors [32, Andreassen E., Bjerck H.B., Olsen B.]. They are fascinated by a kind of dark tourism attraction to the site's massive post-Soviet reminiscences. Pyramiden is well presented by clever and humorous guides employed by the Russian owner of the estate, the coal mining company Trust Arktikugol.

Many other examples can be found where the built heritage of a town has been developed by the property owners in ways useful to local tourism entrepreneurs as well as in positive place branding. One such town is Kaliningrad, formerly Königsberg of East-Prussia, at the southern end of the Curonian Spit. In recent years German-Russian joint endeavours have been successful in reconstructing its historic buildings [33, Browning C.S., Joenniemi P.]. It has been possible to arrive at an inclusive and balanced outlook on the local composite heritage and to use this as a basis for joint restorative work on Kaliningrad's rather few remaining old buildings: the cathedral, the memorial and tomb of Immanuel Kant. This entails acknowledging a past that was almost eradicated during Soviet times, while simultaneously jointly providing something interesting as a result to show to expanding numbers of tourists, making also former inhabitants and their descendants welcome⁶.

Conclusion

Based on participant observation during guided tours, and systematic study of public tourism information, it is possible to discuss what happens during "tourism in action" – how different topics are chosen and communicated. Choices of emphasis in tour designs and guide work can also be improved by better knowledge about the culture and interests of the tourist, especially when considering international customers. Looking at tourism proper it is important to consider why certain ideas and memories, and not others are presented in tourism information and during guided tours in a region.

There is a need for more scholarship on the construction and meaning of subarctic cultural heritage. It can be accommodated by university level research and by sometimes placing sites into a comparative context. The latter facilitates necessary evaluations of the environmental and socio-economic sustainability of heritage management and tourism to the site in question. Well-balanced tours with a broad variety of events will attract new groups and more visitors to the north. Such an approach has the potential to engage more tourists from near and far by providing inspiration and fascination with local cultural variety found anywhere, combining this with an in-

⁶ This is demonstrated in three recent TV documentaries, two produced in Germany and one in Russia: Claus C., Adam H. [producers] *Meine Heimat–Deine Heimat: Mit Wolf von Lojewski durch Ostpreußen*, part 2: Kaliningrader Klopse. Mainz, ZDF: Zweites Deutsches Fernsehen, 2008. URL: <http://www.youtube.com/watch?v=D1UoxYSqMzU> (Accessed: 4 August 2016); Kühnrich S. [documentary film-maker] *Kaliningrad/Königsberg: Eine Deutsch-Russische Versöhnungsgeschichte*. Leipzig, LE Vision Film- und Fernsehproduktion GmbH for MDR: Mitteldeutschen Rundfunk, 2010. URL: <http://www.youtube.com/watch?v=-2a9pjSGTTQ> (Accessed: 4 August 2016); Somov A. [director] *Discovering Russia with James Brown: The Kaliningrad Region*. Moscow, Russia Today & TV Novosti, 2012. URL: <http://rtd.rt.com/films/james-brown-kaliningrad-region/> (Accessed: 4 August 2016).

terest in parallels between human cultures over time and in different places. From the field study and reflections presented in this article the following is recommended:

- Introduce more cultural quality contents in tours, in guide presentations and in place branding. For example: maritime history (Pomor trade, harbour festivals of the sea); the religious borderland: orthodox trails, monasteries; history of polar exploration and scientific collaboration in and around the Barents Sea; Indigenous life and traditional knowledge;
- Arctic tourism management training will benefit from courses on Arctic history, contemporary northern societies, and on issues of fair representation of different “histories” and memories in tourist’s encounters with Arctic cultural heritage;
- More access for tourists into parts of nature parks, by specific trekking trails including some for motorised vehicles for the physically impaired;
- More diversified tours and site promotion based on analysis of the preferences of new or smaller groups of visitors: Asian tourists, creative tourism, gastronomy, angling etc.;
- Integrations of local museums into tourism route development, e.g. according to the Ecomuseum concept.

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Ecological tourism as a factor of sustainable development of the Western Arctic*

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Abstract. The article is based on the expert assessment of ecological tourism as the priority and competitive type of recreational nature management in the Western Arctic. The theoretical provisions are developed and the importance of the tourism industry in the sustainable development of the Russian Arctic is determined based on the analysis of problems and prospects of the modern development of ecological types of tourism in the regions and centers of tourism. The specificity of tourism is discussed considering the increased interest in the Arctic, the growth of cruise tourism and the increase in the anthropogenic load on the polar landscapes. Proposals are given and priority strategic tasks for the development of Arctic tourism are formulated: minimization of anthropogenic impact on the environment and preservation of the cultural and natural heritage of the Arctic, increasing the availability of Arctic territories for tourists. Development of competition in the field of transport, simplification of logistics, the combination of sea cruises with air travel to reduce the cost of travel for those wishing to visit the unique high-latitude Arctic territories and increase the tourist flow. Due to the predominance of expensive types of tourism in the Arctic, support for low-cost and high-income tourism destinations is needed. Innovative investment projects in the field of the Arctic tourism based on clusters could attract tourists and additional investments in infrastructure modernization.

Keywords: *Western Arctic, Arctic tourism, high-latitude archipelagos, tourism, eco-tourism, sustainable development, the national park "Russian Arctic", the Murmansk region.*

Introduction

Considering generally accepted theoretical definitions, ecotourism is a form of sustainable tourism focused on relatively untouched natural areas. The challenges facing environmental tourism are quite consistent with the objectives of the sustainable development [1, Lukichev A.B., pp. 3–6].

The attractiveness of the Arctic and global warming in high latitudes opens up great prospects for the eco-tourism development. The main attractions are the Arctic Islands, incl. the Franz Josef Land and Novaya Zemlya in the Western sector of the Russian Arctic. Currently, the Arctic Islands with a high level of natural preservation have become attractive for tourists. The coasts of the Western Arctic archipelagos, their unique natural landscapes and cultural and historical sites are very promising for the Arctic sea cruises.

The vast majority of tourist attractions are natural objects: glaciers, fjords, rocks, coastal cliffs, waterfalls, bird markets, rookeries of marine animals, etc. The growth of anthropogenic impact on the Arctic landscapes and their vulnerability necessitate the scientific support of programs aimed at the Arctic tourism development and include the assessment of the sustainability of landscapes and the implementation of measures for their protection.

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The tourism industry has consistently called for an effective “mechanism” for the transformation of natural sites into meaningful memorable experience for travelers and tourists [2, Binkhorst E., Dekker T.D.].

Ecological tourism in the Arctic orients tourists to communicate with nature and not just nature but its primeval beauty. So, the most suitable areas for ecological tourism are those with a special environmental status and, above all, the national parks. National parks, incl. the NP “Russian Arctic” — an example of a specially protected natural area, are the most promising form of management of natural resources and environmental protection. They have all the necessary conditions for both working out methods of preserving natural and cultural heritage and for the development of limited tourism and its classic environmental direction.

In 2016, the scientific reference edition “Arctic tourism in Russia” [3, Arctic tourism...] was published by the NArFU publishing house. For the first time, the book presents systematically analyzed aspects of resource potential, attractiveness, opportunities and challenges of ecological, cruise, international and other types of the Arctic in Russia. In the first part of the book [3, Arctic tourism..., pp. 6–117], the basic concepts of tourist attractiveness of the Arctic Islands, resource potential, prospects, opportunities and threats of the Arctic tourism, the tourist rating of the areas of the Russian Arctic and the challenges ecological tourism are presented. The challenges and prospects of the Arctic tourism were also in a focus of the whole section called “Arctic tourism in Russia” of the “Arctic and North” journal (electronic scientific journal of NArFU) No. 23 for 2016. It includes articles by well-known researchers: D.V. Sevastyanov, Yu.F. Lukin, V.S. Kuznetsov, and N.M. Byzova.

The theoretical concept and the value of ecological tourism for the sustainable development of the Western sector of the Russian Arctic

Now, the tourism industry is one of the most important sectors of the economy for many countries and communities around the world. In the Arctic, considering its remoteness and seasonality as well as the historical predominance of intensive exploitation of natural resources, the tourism industry shows a significant increase in the number of tourists and the share of revenues [4, Usenyuk S., Gostyaeva M.].

However, in Russia, which owns almost 2/3 of the Arctic, the development of the Arctic tourism is a new direction in the state strategic planning, research and commercial activities [5, Kharlampeva N.K.].

Integrated development of the Arctic zone of the Russian Federation should also be aimed at stimulating tourism activities. It is one of the priority areas of social and economic activities, due to the high natural and cultural potential of the Russian Arctic and the multiplicative effect of the tourism industry. The Arctic tourism is a strategic direction for the sustainable development of the North of Russia. Also, it can become a significant factor for the protection of the unique natural and cultural heritage and an important driver of the economic development of the Russian Arctic, as the demand for it is growing worldwide today.

In the Development Strategy of the Arctic zone of the Russian Federation until 2020, the most important issues are: “the Arctic tourism development and expansion of environmentally safe types of tourist activity in the Arctic, improvement of legal and regulatory support in the field of tourism, creation of a system of its financial support based on the principles of public-private partnership, promotion of regional tourism clusters, and promotion of the Arctic tourism on the national and international levels”¹.

Even in case of the weak development of tourism infrastructure in the polar latitudes of Russia, we observe a steady increase in interest in traveling to the Arctic. The increase in the number of foreign tourists in the Western sector of the Arctic is associated with research and scientific expeditions visiting the difficult-to-access areas with unique nature.

Global warming and melting of sea ice have made the Arctic waters more and more open for cruise ships and navigation in summer. Not only the mainland, but the islands of the high-latitude areas have become more accessible.

It should be noted that the problems of tourism development in the Russian Arctic are due to the high cost of transport services, the lack of appropriate infrastructure, institutional restrictions on passing (border and customs control), and high living costs do not allow to rely on the mass high-latitude Arctic tourism in the near future [3, p. 96].

It should be noted that tourism in the Arctic has its own regional specificity, associated with special natural and climatic conditions and the need to ensure reliable safety of tourists staying there. In addition, for the Arctic specially protected natural areas (protected areas), the issue of accessibility is very important, as well as sea or air travels to the high-latitude Arctic for tourists plays an important role. All this complicates the work of tourist companies and does not contribute to their economic efficiency.

In general, it could be noted that all the tourist companies operating in the Arctic are interested in a minimal impact on the environment caused by the population in the Arctic. So, the nature remained in a natural state favorable for animals and birds [6, Kuznetsov V.S., p. 42–57].

The development of measures aimed at increasing the attractiveness of the high-latitude Western Arctic archipelagos for the development of tourism should be based on the peculiarities of the geographical location of these territories. First of all, it is necessary to consider the inaccessibility of the territory, the island's maritime location, severe climatic conditions and pronounced seasonality, which do not allow to speak about the year-round visits. The remoteness of the territory from major transport hubs and the priority of sea transport to reach the islands determine the high costs of sea cruises, which prevail in the Arctic tourism.

Also, the cost of sea cruises depends on the tour operator, the class of the vessel, the comfort of the cabins and the duration of the trip. These factors objectively hinder the availability of

¹ Strategiya razvitiya Arkticheskoy zony Rossijskoj Federacii i obespecheniya nacionalnoj bezopasnosti na period do 2020 goda. [Strategy for the development of the Arctic zone of the Russian Federation and national security for the period until 2020]. URL: https://minec.gov-murman.ru/activities/strat_plan/arkticzone/ (Accessed: 21 August 2017) [In Russian].

the Arctic tourism for many social groups in Russia. The cost of the Arctic tours for Russians is also high due to the devaluation of the ruble. Nevertheless, we positively assess the existing opportunities for the development of the Arctic tourism in the Russian Arctic. Also, it should be emphasized that the opportunities of the existing resource potential of protected areas are not fully used.

The most urgent problem is the consideration of the optimal capacity of protected areas to take tourists from the standpoint of ecology. It is very important not to harm nature, not to destroy unique natural and cultural objects, considering not always high level of ecological education and culture of some part of tourists. Therefore, the administrations of protected areas reasonably introduce all sorts of restrictions and regulate the number and activities of tourists and pilgrims. Special attention should be paid to visiting the impact areas, the Arctic "hot spots", ensuring the safety and health of all tourists. The balance of economy and environment in the Arctic is no less important than in other areas [7, Lukin Yu.F., pp. 116–122].

Travel to the Arctic should be available to tourists with different levels of income. It is necessary to develop competition in logistics and transport services to improve transport accessibility and to reduce travel costs.

One of the promising directions of economic diversification in small settlements of the Western Arctic is tourism. However, only mass tourism could give a multiplier effect and become a driver for the development of small business. Innovative investment projects in the Arctic tourism should attract tourists to the region, and this, as it is known, will attract additional investment in infrastructure modernization and sustainable development of the Western Arctic.

The peculiarity of tourism in the Western Arctic is tourist activities associated with the predominance of the niche types of tourism (sea cruises, mountain ski tourism), aimed attracting tourists with high income. Despite the fact that niche tourism is an expensive type, its contribution to the economy of the subjects of the Arctic zone of the Russian Federation is not more than 1% due to the transport remoteness, low investment activity of regions, and low profitability of some types of tourism. As a result, the long-term strategic tourism activities in the Western Arctic will support cost-effective and profitable types of tourism, e.g., event and eco-tourism [8, Leonidov E.G., pp. 206–211].

Areas and tourist centers of the Western Arctic

The territory of the Western Arctic includes the entire Murmansk region, The non-German Autonomous region, the Northern regions of the Arkhangelsk Oblast and the Republic of Karelia, adjacent to the White sea, high-latitude Arctic archipelagos of the Arctic ocean (the Barents sea region). One of the key areas for the development of Arctic tourism is the Primorsky district of the Arkhangelsk Oblast-the largest administrative region of Russia, including such popular tourism centers as the archipelago of the land of Fran-CA-Joseph, Solovki, Small Karelians, the national Park "Onezhskoe Pomorie". If the high-latitude summer Arctic tourism is more focused on foreign

tourists, the "mainland" part of the Western Arctic is attractive mainly for the Russian citizens [9, E. Grushenko, p. 508].

In the territories of the Western Arctic, a comprehensive program of conservation and development of unique nature, landscape, historical and cultural territories and natural monuments is being implemented on the basis of the new specially protected areas and sustainable development of existing ones involved in ecological tourism. The remote Pomor settlements are reviving with the development of event tourism (Ribera, Kuzreka, and Umba), new ecological routes to the remote objects appear (the Lapland reserve, Seidozero, village Umba, the Museum-reserve "Kaozerskie Petroglyphs", and the Pasvik reserve). On the White Sea coast, along with the diving and rural tourism, ecological "water tourism" is gaining popularity: observation of marine animals (Kandalaksha, national Park "Onezhskoe Pomorie", Karelian Nilmoguba, Pomor Letnyaya Zolotitsa, and Beluga Cape on Solovki) [10, Grushenko E., pp. 69–70].

To regulate uncontrolled tourist flow, sustainable development of ecological tourism and preservation of the unique natural heritage, new protected areas (Nature Park on Sredniy and Ribachiy peninsulas and National Park "Hibina") are organized.

The main promising centers of the Arctic tourism in the high latitudes are the archipelago of Svalbard and the National Park "Russian Arctic", organized on the archipelago of Franz Josef Land (FJL) and Novaya Zemlya. The archipelagos of Svalbard and Franz Josef Land may become the growth points of the Russian Arctic tourism as a geopolitical factor in the strengthening of Russia's presence in the Western Arctic.

Currently, *the National Park "Russian Arctic"*, established in 2009, includes the Northern part of the Novaya Zemlya archipelago and the Federal nature reserve "Franz Josef Land". It is the northernmost and the largest marine protected area in the Arctic with 85% of the archipelagoes covered by glaciers. In 2016, the territory of the NP "Russian Arctic" was expanded by 7.4 million hectares. The expansion was due to the Federal reserve "Franz Josef Land" with an area of 1.6 million hectares and the area of internal sea waters and the territorial sea of Russia with an area of 5.8 million hectares. Thus, the NP "Russian Arctic" has become the largest in Russia: its area is 8.8 million hectares². It is also the largest land national park and marine nature reserve in Russia. The expansion of the Park has contributed to the conservation of the Arctic rare species of animals and birds listed in the Red Book of Russia and the world, as well as their habitats.

In the park, the largest in the Northern hemisphere bird markets, walrus rookeries, home to polar bears, bowhead whale and seals are found. The park is created to preserve the unique nature of the Arctic. The main type of the tourist delivery is sea cruises, which are one of the strategic objectives of the national park.

² Sajt nacional'nogo parka «Russkaya Arktika». O parke. Territoriya. [The site of the national park "Russian Arctic". About the park. Territory]. URL: <http://www.rus-arc.ru/ru/AboutPark/Territory/> (Accessed: 12 september 2017) [In Russian].

In connection with the creation of the national park, icebreaking cruises to the North pole are carried out from Murmansk mainly through the FJL with a visit to the Novaya Zemlya. In the summer 2015, 11 cruises were completed in the NP "Russian Arctic". Among them — 7 cruises to the North pole on the nuclear icebreaker "50 let Pobediy" (it is the hallmark of the Arctic tourism, as it is an exclusive Russian tourist product) with a visit to the FJL. One of these cruises to the "top of the planet" had almost 100% Chinese tourists³. In 2015, the total tourist flow to the NP "Russian Arctic" amounted to 1,225 people, which is a record in the entire history of cruises to the area⁴. In 2015, a sea border checkpoint for foreign tourists was opened in the FJL archipelago in a test mode. It made it possible to simplify border customs procedures and shorten the route of cruise flights on the transit route from Spitzbergen to FJL for three days without visiting Murmansk or Arkhangelsk. In 2015, the Rosturizm and Poseidon Expedition companies organized the first three expedition cruises for foreign tourists (500 people) with a visit to Svalbard and FJL. The cost of the cruise is from \$ 7,000 to \$ 14,000.

In 2017, the territory of the NP "Russian Arctic" was visited by 1,142 tourists. The growth compared to 2016 was 20% (Table 1). This year, cruise ships following three routes entered the Russian Arctic: 6 — from Murmansk to the North Pole on the nuclear icebreaker "50 let Pobediy"; 3 — on the ship "Sea Spirit" on the route Spitsbergen — Franz Josef Land. Two flights aboard the "Akademik Shokalskiy" vessel were made along the Northern Sea Route (Murmansk — Anadyr).

The national composition of passengers is as follows: 26% are Chinese tourists, 17% are German. Russians tourists — only 6%. There were also two cruises with tourists from France⁵. The cost of participation in the cruise on the nuclear icebreaker "50 let Pobediy" is from \$ 27,000 to \$ 40,000; an average of about 120 passengers aboard and almost always full occupancy of the ship⁶.

The Arctic cruises mainly take place around the FJL archipelago, the northern part of Novaya Zemlya is less visited. Tourists visiting the bird markets and watching the Arctic animals on the rock Rubini, in the Bay of Tikhaya, on the islands of Champa and Rudolph. Landings from a ship are usually made on special rubber motor boats of the "Zodiac" type or with the help of a helicopter. A lot of impressions from travelers leaves landing on Heiss Island, surrounded by floating icebergs and ice. White bears around, and huge walruses lie on the ice floes — real polar exotic.

It should be noted that a great attention is paid to the careful attitude to the nature of the Arctic when organizing landings of tourists to the islands. The preservation of the unique landscape and historical-cultural heritage of the national park is one of the most important issues for

³ "Atomflot" dostavit na Severnyj polyus kitajskih turistov. ["Atomflot" will deliver Chinese tourists to the North Pole.] URL: <http://www.mvestnik.ru/shwpgn.asp?pid=2015071012> (Accessed: 20 January 2017). [In Russian]

⁴ Sajt nacional'nogo parka «Russkaya Arktika». Turizm. Statistika. [The site of the national park "Russian Arctic". Tourism. Statistics]. URL: <http://www.rus-arc.ru/ru/Tourism/Statistics/> (Accessed: 20 September 2017) [In Russian]

⁵ Glava nacparka «Russkaya Arktika» o turizme i letayushchih pingvinov. [The head of the national park "Russian Arctic" about tourism and flying penguins] URL: <https://lenta.ru/articles/2017/07/06/arktica/> (Accessed: 20 September 2017). [In Russian]

⁶ Sajt informacionnogo agentstva Arktika-Info. Novosti. [The site of the news agency Arctic-Info. News] URL: <http://www.arctic-info.ru/news/tourism/> (Accessed: 20 September 2017) [In Russian]

the organizers of ice-breaking cruises. The guests of the national park took part in the garbage collection in the Tikhaya Bay (Hooker Island), which is now completely cleared of man-made garbage. Each tourist gives the national park around 50 euros income⁷. It is invested in environmental projects and infrastructure development. “Russian Arctic” is the main operator of a large-scale federal program of cleaning the Arctic from waste left from the active economic, scientific and military activities of the USSR in these territories.

Table 1

Sea cruises to the national park “Russian Arctic”⁸

Year	2014	2015	2016	2017
Number of cruises	6	11	9	12
Number of tourists	738	1,225	954	1,142

Simplification of logistics, e.g., the use of aviation, will make it cheaper to travel to a national park and to increase tourist flows. The creation of the multifunctional Arctic complexes with helipads in the “Russian Arctic”, which can be visited by tourists and scientists, can significantly reduce the price of tours. Thus, in the northernmost border control post in the world — on Alexandra Island, FJL — defense infrastructure objects are being created, incl. a military airfield, which in the future can be used for organizing aviation drills. A program of stationary stay of tourists on the island of Alexandra, designed for 3–5 days, is being developed.

Specialists of the national park are counting on the further growth of the Polar tourism. The creation of a permanent border crossing point, the organization of ecological paths, museum expositions, mini-hotels, viewing platforms and visitor centers in the NP “Russian Arctic” will help to increase cruise ship calls, sustainable development of ecological tourism and the growth of tourist flow up to 5–7 thousand people per year. In the foreseeable future, the number of tourists visiting the NP “Russian Arctic” could reach 40–50 thousand people a year. The Spitsbergen archipelago annually receives about 76 thousand tourists, about 30% of them are also ready to visit the neighboring Russian protected areas: Novaya Zemlya and FJL⁹. They are almost untouched by human territories with unique natural landscape.

Until recently, there had been no tourist infrastructure on the Arctic islands. However, soon there will be four strongholds in the national park, which will include visiting centers (three for FJL and one at Novaya Zemlya) and other environmentally friendly infrastructure facilities. It is planned to build observation platforms, tourist ecological paths, information boards and mini-hotels.

In the national park “Russian Arctic”, the first ecological route to the Bay of Tikhaya, Hooker Island, FJL archipelago. The ecological route will help to preserve the fragile ecosystem of the bay. An exposition of the northernmost museum in the world — the open-air museum “Living His-

⁷ Ibid.

⁸ Sajt nacional'nogo parka «Russkaya Arktika». Turizm. Statistika. [The site of the national park “Russian Arctic”. Tourism. Statistics]. URL: <http://www.rus-arc.ru/ru/Tourism/Statistics/> (Accessed: 20 September 2017) [In Russian].

⁹ Sajt informacionnogo agentstva Arktika-Info. Novosti. [The site of the news agency Arctic-Info. News] URL: <http://www.arctic-info.ru/news/tourism/> (Accessed: 20 September 2017) [In Russian].

tory of the Arctic”, established on the basis of the former polar station, will appear along the route. The creation of an interactive exposition of the new visitor center is connected with the plans of the national park to expand the range of tourist services in Tikhaya Bay. In recent years, the level and the list of services has increased significantly. A network of landscaped routes appeared there, as well as tourist navigation, the most northerly mail in the world, and a souvenir shop. The need for a visitor center has matured due to the fact that about 110 people are landing at the same time¹⁰.

The priority type of tourism in the *Murmansk region*, included in the Arctic zone of the Russian Federation, is ecological tourism. The main areas with high potential for the development of ecotourism are Khibiny, Lovozero tundra, Pechenga, Terek and Kandalaksha districts. Eco-tourism is advisable to be developed in the protected areas to regulate and account the flow of tourists. In 2016, the protected areas of the Murmansk region, the federal (reserves) and regional significance (reserves and nature park) were visited by more than 20 thousand tourists. The natural park “Peninsula Rybachiy and Sredniy” was visited by 16 thousand tourists who had an electronic registration for visiting the park¹¹.

Currently, due to problems with the coordination of the park boundaries between regional and federal departments, creating of the Khibiny national nature park is being delayed. The creation of the national park adjacent to the territory of the tourist cluster with the same name in Kirovsk is provided by the “Concept of development of specially protected natural areas of federal significance” adopted by the Government of the Russian Federation. The Lovozero area will not be included in the national park. According to environmental experts, the ecosystems of the Lovozero Mountains as part of the now existing regional reserve “Seydyavr” or the proposed new ethno-ecological protected area will be maintained much better than in the federal national park.

The increasing unorganized flow of tourists has a negative impact on the local cultural and natural landscape. Most of the Sami have a negative attitude towards unorganized visits to the Lovozero and especially to Seydozero. The way out of this situation is seen in the creation of an ethnic and ecological protected territory in the Lovozersky District, the status of which combines the solution of nature-conservation and cultural-ethnic problems. The creation of an ethnic and ecological reserve in the Lovozersky District suggests the development of tourism if it develops under the control of the Sami community and does not cause significant damage to nature, but, on the contrary, serves educational and educational purposes. The organization of such a territory in the Murmansk region and the attempt to revive the traditional environmental activities of the Sámi can serve as a “model” of integration of the traditional lifestyle of the indigenous people and the modern market economy [11, Vorobyevskaya E.L., Sedova N.B., pp. 343–349].

¹⁰ Oficial'nyj turisticeskij portal Arhangel'skoj oblasti. [Official tourist portal of the Arkhangelsk Oblast]. URL: http://www.pomorland.travel/news/v_arktike_v_blizhajshie_dva_goda_budet_sozdan_vizit_tsentr/ (Accessed: 20 September 2017) [In Russian].

¹¹ Oficial'nyj turisticeskij portal Murmanskoj oblasti. [Official tourist portal of the Murmansk region]. URL: <http://murmantourism.ru/> (Accessed: 09 September 2017) [In Russian].

The organization of a national footpath could be an innovative direction in the development of ecological tourism in the Extreme North. National trails are mass pedestrian routes that have become very popular all over the world, except for Russia. It can be proposed to organize such a trail on the territory of the Khibiny and Lovozero. The national footpath should be extended, equipped, accessible to all segments of the population and free to visit. The trail should be laid by experienced tourists along unpaved paths calling at the most beautiful and interesting places in the region.

Conclusion

In conclusion, it should be noted that the intended role of the tourism sector in the preservation of the cultural and natural heritage of the Arctic territories makes it possible to consider the Arctic tourism as an innovation, formed among the regional and sectoral innovation systems of the territories themselves. Global warming, an increase of the Arctic waters in the summer frees up the northern seas for cruise navigation, which predetermines wide opportunities for the development of marine and ecological tourism.

The primary strategic objectives for the sustainable development of the Arctic tourism in the Western Arctic should be:

- increasing the availability of the unique Arctic areas for tourists with different income levels;
- organization of regional tourist and recreational clusters on the basis of modernization of transport and tourist infrastructure;
- creation of a special cruise fleet and coastal tourist infrastructure (to increase the stay of tourists on land);
- attracting investment in the tourism industry of the Arctic in the form of a public-private partnership;
- strategy of global promotion of the tourist potential of the Russian Arctic;
- development of competition in the field of transport, simplification of logistics;
- minimizing the human impact on the natural environment of the Arctic;
- preservation of cultural and natural heritage sites of the Arctic — the most important indicator of the presence and activity of Russia in the Arctic, the issue of national security [10, Grushenko E.B., pp. 75–76].

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Challenges of making the project of mineral resource center in the Kola support zone of the Russian Arctic*

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Abstract. The article analyzes the managerial innovation of the Russian government on a new type of territorial management of the Arctic macroregion - support zones of development. The authors present an overview of the mineral deposits developed and planned for development within the boundaries of the Kola Peninsula and investment projects of the largest mining companies of the Murmansk region and, above all, the project “Kola Chemical and Technological Cluster” in accordance with the requirements developed by the federal regulator for forming mineral resource centers in support zones of development in the Arctic. Particular attention is paid to the deposits of strategic and scarce minerals attractive for private investors. They will not require significant expenditures from regional authorities and local self-governments for development activities or any other methods of the state support and are socially significant for the region. The authors also discuss methodical approaches to management decisions when selecting the most efficient projects for implementing, the goals of socio-economic development and ensuring the ecological safety in the Arctic region under the global climate changes. Basing on the draft federal law “On the Arctic zone of the Russian Federation”, it was concluded that the mineral resource center of the Murmansk region was not likely to be included in the pilot project in 2018-2020 to form the Kola support zone of development in the Arctic. Proposals on harmonizing the requirements for registering applications of the Russian Arctic regions for forming the mineral resource center of the Kola support zone with the order on inclusion of mineral reserves in the state balance list. The authors justified methodology for developing investment projects and the procedures for their state comprehensive and environmental assessments. Some proposals for enhancing the efficiency of activities of applicants and participants in the support zone are made.

Keywords: *the Kola support zone of development, mineral resource center, pilot project.*

Introduction

The government did not abandon the strategic intent on the social and economic development of the Arctic zone of the Russian Federation. Today it remains a priority national project, despite the unfavorable geopolitical situation, the high uncertainty of the world economy and internal economic and environmental risks. The most significant economic risks are: 1) the need to allocate all state and private resources, incl. financial, for the implementation of the Arctic projects. Many

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international financial institutions refuse to provide Russian business with loans and state reserve funds are reducing;¹ 2) a possible decrease in profitability for investors caused by a legislatively defined transition to the best available technologies in 2019; 3) the new US sanctions of April 6, 2018 prohibited the import of products of resource companies, the freezing of their assets and the ban on any operations with authorized persons in the US and in some other countries.

In recent years, environmental risks have been grown due to the refusal of foreign producers of environmentally friendly technologies and equipment to sell them to Russian companies. The situation is more complicated due to the fast implementation of large-scale investment projects in the Arctic and the Arctic Ocean under the conditions of the state environmental supervision and control system creation.

The priority of the national project on the social and economic development of the Arctic zone of the Russian Federation (AZRF) is actively supported by political acts: numerous statements by senior officials of the country and the Arctic regions, high-ranking officials, resolutions of forums, congresses and conferences. E.g., the decision to form the main development zones was first announced in March 2016 in Murmansk at the meeting of the State Commission for the Development of the Arctic. The Arctic issues are also widely covered by media, incl. specially created websites. In December 2017, on the VII International Forum “The Arctic: the Present and the Future”, the governor of the Murmansk region Marina Kovtun sharply criticized the bill of the federal law “On the development of the Arctic zone of the Russian Federation”, issued in accordance with the Law “On Support Zones of the Arctic”².

According to specialists, the legal regulation of the Russian Arctic development is formed too slowly, that is, it is behind the needs of management. The new (the third) “State Program on the Social and economic development of the Russian Arctic” was again approved before the federal law “On the Arctic Zone” was adopted. It was in the new draft of this law that its initiators elaborated in detail the concept of “supporting development zone in the Arctic”, the organizational and economic mechanisms for its formation, including the requirements for project proposal and application for inclusion in the list of pilot projects for their creation³.

In our opinion, the fact that the new draft law does not reflect the priorities of the Arctic development declared in the “Strategy for the Development of the Arctic Zone of the Russian Fed-

¹ K nachalu 2018 goda fond nacional'nogo blagosostoyaniya sokratitsya do 3,7 trln rublej. [By early 2018, the national welfare fund will be reduced to 3.7 trillion rubles]. URL: <https://www.vedomosti.ru/finance/news/2017/12/07/744497-k-nachalu-2018-goda-fond-natsionalnogo-blagosostoyaniya-sokratitsya-do-37-trln-rub> (Accessed: 24 August 2018). [In Russian]

² Segodnya otkryvaetsya VII Mezhdunarodnyj forum “Arktika: nastoyashchee i budushchee”. [Today the VII International Forum “The Arctic: Present and Future” is opening]. URL: <http://www.b-port.com/news/item/208682.html> (Accessed: 24 August 2018). [In Russian]

³ Proekt federal'nogo zakona “O razvitii Arkticheskoy zony RF”. [The draft federal law “On the development of the Arctic zone of the Russian Federation”]. URL: <http://docs.cntd.ru/document/555622319> (Accessed: 24 August 2018). [In Russian]

eration and Ensuring National Security for the period up to 2020” is a palliative decision of the government due to the lack of strategic documents of the national level⁴.

Adoption of the federal law on the Arctic macroregion before the approval of the Spatial Development Strategy of the Russian Federation caused a difficult situation. The Spatial Development Strategy is the foundation for the social and economic development programs of all regions of the country, incl. its four macroregions, as well as sectoral strategies. Approval of the federal law on the Arctic macroregion before the Strategy means a need for several dozens of by-laws and harmonization with many applicable federal laws. A quicker and easier way would be to make changes to federal laws on the priority issues of the “Strategy for the Development of the Arctic Zone of the Russian Federation”. E.g., ensuring environmental safety issue in the laws on environmental protection, on environmental impact assessment, on production and consumption waste, on specially protected natural territories, etc., in order to legally establish qualitative and quantitative guidelines for the special regime of environmental management in the Arctic. It should be noted that in the previous versions of the draft law “On the Arctic zone” all the provisions on the special regime of environmental management in the Arctic were excluded.

The leaders of the Arctic territories of the Federation reasonably associate the prospects of their regions with the use of natural resources. Resources have always been the main reason for the territorial expansion to the north since the Novgorod feudal republic. Scientific and technical progress has somewhat changed only the composition of natural resources – the reason why for more than a thousand years (with short intervals) this arduous and costly extraction has been carried out.

Throughout the modern Russia history, most of the strategic intentions of the authorities in the polar regions were limited by development of mineral deposits and this was reflected in strategic documents. The mineral development projects have been rarely implemented for the past 26 years. Therefore, many of them have been just transferred from one social and economic development program of a region or federal district to another one.

The developers of the two previous state programs for the social and economic development of the Russian Arctic chose a beaten track and collected suggestions and drafts from the Arctic regions. Almost 50% of the total number of suggestions and drafts came from mining and processing industry and 7% were geological exploration and offshore projects. Consequently, almost two thirds of all projects were directly related to the development of the mineral resources in the Russian Arctic⁵.

⁴ “Strategiya razvitiya Arkticheskoy zony Rossijskoj Federacii i obespecheniya nacional'noj bezopasnosti na period do 2020 goda”. [“Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2020”]. URL: <http://government.ru/info/18360/> (Accessed: 24 August 2018). [In Russian]

⁵ Postanovlenie Pravitel'stva RF ot 31 avgusta 2017 № 1064. Gosudarstvennaya programma Rossijskoj Federacii “Social'no-ehkonomicheskoe razvitie Arkticheskoy zony Rossijskoj Federacii” [Government Decree of August 31, 2017 No. 1064. State program of the Russian Federation “Social and economic development of the Arctic zone of the Russian Federation”]. URL: <http://government.ru/programs/236/events/> (Accessed: 24 August 2018). [In Russian]

Today, when the progressive project management theory has been borrowed from abroad and finally became available. Its best practices are increasingly used in our country. It is no longer necessary to prove that the mineral development projects for the Arctic (mentioned above) did not meet the relevant requirements (feasibility study of fields, investment projects, etc.)^{6,7}.

Usually, the feasibility evidence and the expected benefits of a particular field was reduced to a listing of its technical and economic feasibility study (TES). Most often, it was done earlier, in conditions of a planned economy or it was a feasibility study developed by mining and scientific organizations for the mining companies. It can be argued that in both cases the implementation of the submitted projects could not be done, ignoring other reasons, due to their unsatisfactory quality. E.g., in 1970s-1980s, the feasibility study of all mineral deposits of the Murmansk region included technologies known and used that time but many of them are obsolete now. The feasibility study with more advanced mining or processing technologies, incl. the integrated use of multi-component ores, usually required a proper marketing strategy (distribution channels, demand volumes in different markets, logistics costs). Also, capital investments and current expenditures on environmental activities were underestimated to improve the performance indicators of an investment project.

In addition, the regional authorities of the Federation did not participate in all projects. Now they are participating through the project's offices under the government in each region.

The aim of our study was to analyze the feasibility and validity of the federal requirements for the establishment of a mineral resource center under the Kola support zone and the work for its optimization. Regional authorities are responsible for the applications. So, the objectives of the study also are to work out recommendations to improve the efficiency of their activities.

Realistic definition of the mineral resource center prototype within the Kola support zone of the AZRF

In accordance with the new "State Program for Social and Economic Development of the Arctic zone of the Russian Federation", the establishment of a support zones should be carried out in two stages: 1) pilot projects in 2018–2020 and 2) establishment and maintenance of support zones in 2019–2025.

Unlike previous programs, the new program has funding: 12 billion rubles for pilot projects, and it is planned to increase funding from the state budget by more than 6 times per year for the establishment and operation of support zones. The government also expects to attract even more funds from non-budgetary sources (public-private partnership).

⁶ Iz chinovnikov sobrali sovet po proektnoj deyatel'nosti. 19 iyunya 2017 g. [Officials established the Council on Project Activities. June 19, 2017]. URL: <http://www.b-port.com/news/item/202379> (Accessed: 24 August 2018). [In Russian]

⁷ Rukovodstvo k svodu znaniy po upravleniyu proektami (rukovodstvo RMBOK). 5-e izd. 2013. Korporativnaya sistema upravleniya proektami (KSUP). [A guide to the body of knowledge on project management (the RQMC manual). 5th ed. 2013. Corporate project management system (CPMS).URL: <http://mahamba.com/ru/korporativnaya-sistema-upravleniya-proektami-ksup> (Accessed: 24 August 2018). [In Russian]

As we know, the Federal government has identified 8 main support zones in the Arctic: Kola, Arkhangelsk, Nenets, Vorkuta, Yamalo-Nenets, Taimyr-Turukhanskaya, North Yakutsk and Chukotka. Pilot projects involve three of them: Kola, Arkhangelsk and the North Yakutsk. The chosen areas are intended to become a kind of an “economic development belt” along the Arctic Ocean coast, a network of continental bases to ensure the functioning of navigation along the Northern Sea Route.

A set of pilot projects has not yet been completed. The Federal regulator and the regional authorities explain it by the lack of the necessary calculations to determine national, regional and sectoral optimality of the proposed projects, or unsatisfactory performance of proposed projects from the federal perspective that leads to a number of checks by the federal authorities.

After the Federal bill with a detailed description of the requirements for the projects to be a part of the support zone, the regional authorities began to speak about their excessive rigidity and overstatement. Analysis of the projects accepted as pilot ones leads to the conclusion that first of all, it is planned to focus on infrastructure (railways, seaports, coal and oil terminals, coastal support for offshore projects, incl. ship repair). Most of these projects are in government sectoral programs. On 1 January 2018, the Federal targeted programs integrated into the pilot state programs were terminated ahead of schedule.

Only in Arkhangelsk, it is planned to start the development of the Pavlovsk lead-zinc deposit on the Novaya Zemlya archipelago and construct a mining and processing plant. In Kola, no mineral development and processing projects are planned.

In the new version of the draft federal law “On the development of the Arctic zone of the Russian Federation”, the regional authorities got the right to exercise the authority of the Federal law “On subsoil” and “participate in the development and implementation of state programs on geological study of the subsoil and development of the mineral resources of the Russian Federation”, i.e. on the territories with the federal ownership. In other words, the Supreme Executive body of the subject of the Federation will be the “applicant” for the projects aimed at formation of mineral complexes for their inclusion in the support zone.

The largest industrial projects, proposed by the authorities of the Arctic subjects are new mineral resource development projects and new related industrial production or the development of existing mining and metallurgical enterprises, important of the economy of the polar territories. As it has been already mentioned, all attempts to include the mining and related industrial projects in the Kola support zone were rejected by the Federal regulator. But the government of the Murmansk region has a landmark which corresponds to the idea of the Federal regulator about the mineral resource center as part of the support zone of the Arctic development.

According to the definition contained in the draft Federal law, “mineral resource center (MRC) is a set of deposits, both developed and planned for development, and promising areas associated with existing and planned infrastructure and with a single point of shipment for extracted

raw materials or products to the federal or regional transport system (railway, pipeline and sea transport) for delivery to consumers”.

The definition suggests three mandatory MRC features:

- national economic purpose (efficiency), i.e. extracted raw materials or products are intended for shipment outside the support zone;
- overall existing and planned infrastructure (transport and energy);
- existing and planned infrastructure should meet the needs of developed deposits and deposits planned for development.

In 2018, the Murmansk authorities resumed attempts to confirm the priority of the project “Kola chemical and technology cluster (KCTC)”, which was included in the two previous state programs of social and economic development of the Arctic zone of the Russian Federation but excluded from the third one. Such a “return back” happened due to several reasons. First of all, the Kola Scientific Center of the Russian Academy of Sciences is transforming to a new territorial structure – the Federal Research Center (FIC CSC RAS). Its institutes have been the initiators and the developers of the project “Kola chemical and technology cluster” since 2012. The appearance of the FIC CSC RAS will combine all the resources necessary for justification of technologies and new products. E.g., a sorbent for decontamination of liquid radioactive waste (LRW), which is obtained from local raw materials, is now produced in a small, 7.5-liter autoclave at the installation of the Institute of Chemistry and Technology of Rare Earth Metals and Mineral Raw Materials (IHTR-EMC FIC KSC RAS). This year, the FIC KSC RAS has planned to complete a pilot synthesis plant for obtaining innovative titanium sorbents and to continue the series of their tests at industrial facilities for the disposal of LRW and other wastes. Also, this year, the FIC KSC RAS scientists are planning to complete the development of industrial technology for the production of titanium and titan silicate sorbents from titanite concentrate of the JSC “Apatit” and its processing at the Monchegorsk site of PJSC “Norilsk Nickel” and to prepare a sufficient number of sorbents for large-scale testing.

The progress of the Kola chemical and technological cluster will be facilitated by the agreement on cooperation between the government of the Murmansk region, the CSC RAS, the Kirov branch of JSC “Apatit”, the branch of JSC “Rosenergoatom”, Kola nuclear power plant and JSC “Kola MMC” to create sorbents for decontamination of liquid radioactive waste using local raw materials. The agreement was signed last year, in November, at the VII International Conference “Mining Industry of the Barents Euro-Arctic Region: View to the Future”. This agreement differs from the others: all interested parties not only agreed to join efforts but also decided to provide financing at the expense of industrial and energy companies of the region.

Scientific publications about the project “Kola chemical and technological cluster” let us to conclude that this project is the most scientifically justified and innovation [1, Kalinnikov V.T., Nikolaev A.N.; 2, Masloboev V.A.; 3, Fedoseev S.V.]. Its economic importance is undoubtable, as the cluster's products include import-substituting, strategic and structural materials that ensure national and environmental safety. The development of many of the country's major deposits, as well as the Kola Peninsula deposits, is now constrained by a decline in demand for certain types of

minerals in foreign markets and — due to low demand — in the home market. The production of the Kola chemical and technology cluster is less dependent on the demand, as the production of rare-earth mineral concentrates and metals is relatively low-tonnage (the volume of production in the world is expressed in thousand tons). Due to the existence of import and export quotas in China — the main producer of rare-earth products, the constant changes in the number and content of quotas and increasing demand for rare-earth mineral products in industry, prices for such type of products are constantly growing.

Production of rare-earth mineral concentrates is planned to be organized on the basis of Lowzero deposits of loparite and eudialyte; Kovdor deposits of magnetite, apatite, baddeleyite, phlogopite and olivine; and Khibiny deposits of apatite, nepheline and titanite. They have been already developing by large mining companies of the Murmansk region. So, the production of concentrate won't be started "in the open field" [5, Vinogradov A.N.; 6, Kharitonova G., Ivanova L.V.; 7, Ivanova L.V., Kharitova G.N.; 8, Bjørkan M., Bourmistrov A.]. However, the production of rare-earth mineral concentrates and pure metals still requires new production facilities at existing enterprises and the diversification of their production. In other words, companies should include investment projects for new industries in their strategic plans. By now, companies have been limited only by the agreements on cooperation. It is insufficient for the Kola chemical and technological cluster, even if it will be an accessory project of the Kola support area.

Another issue is the dependence of the Murmansk region's economy on the supply of fuel and energy resources from the outside, since it has no own deposits of coal, oil or natural gas. Only electricity is produced by the Kola nuclear power plant in excess.

In other words, the energy infrastructure necessary for the operation of energy-intensive production of rare-earth mineral centers is insufficient, or rather, will require additional costs for the purchase of fuel and energy resources and their delivery to the Murmansk region (coal, fuel oil, and liquefied gas). In 2014, immediately after it had become clear that the development of the Stockman gas field and a gas pipeline through the territory of the Murmansk region were postponed, the government of the Murmansk region tried to convince PJSC "Gazprom" to solve the energy problem by building a main gas pipeline with a length of 1,300 km, connecting the Kola Peninsula with the gas transportation system of the North-West of Russia. This project is of interest to all major mineral companies of the Murmansk region (JSC "Apatit" (JSC "PhosAgro"), JSC "Kola MMC", JSC "North-West Phosphorus company", JSC "Olkon", JSC "Kovdorsky GOK" (JSC "EvroKhim"), who plan to develop their industries.

Thus, it can be concluded that the project "Kola chemical and technology cluster" should be considered as the most realistic prototype of the mineral resource center in the Kola support zone of the Arctic, if the state program of the Russian Federation "Social and Economic Development of the Arctic zone of the Russian Federation" and the state program of the Russian Federation "Development of the transport system" will include an infrastructure project for the construc-

tion of a gas pipeline. After this project, all the necessary conditions for a mineral resource center within the Kola support zone of the Arctic will be available.

However, the draft law “On the Arctic zone of the Russian Federation” contains a list of specific requirements for project proposals for the support zone, implementation of some projects (the proposal should meet all the requirements to be considered) is difficult or simply impossible at the current level of information support, strategic planning, design and interaction of the authorities of the Arctic regions with business structures. Due to the fact that the “State Program for Social and Economic Development of the Arctic zone of the Russian Federation” under the sub-program “Formation and functioning of the support zones of development” provides for “research work aimed at the formation of the support zones of development”, the objectives of our study included the development of methodological proposals for the harmonization of requirements for applications of the Arctic subject of the Federation on the formation of the mineral resource center of the Kola support zone, primarily, in case of the existing regulatory framework of subsoil use, environmental protection and methods of investment project development.

Justifying the requirements for of the application for the mineral resource center project in the Kola support zone of the Russian Arctic

The content of the draft federal law “On the Arctic zone of the Russian Federation” shows that it is a law on supporting zones. This was repeatedly indicated by the governor of the Murmansk region and other top officials^{8,9}.

In terms of forming support zones and the application requirements, this draft law can be attributed to the “direct action” act, i.e., it does not require the presence of concretized and developing regulations. It should be noted that this contradicts the “State Program for Social and Economic Development of the Arctic zone of the Russian Federation until 2025”, i.e., its sub-program “Formation and operation of support development zones” and its plans to approve regulatory acts for the formation and functioning of the support zones.

The draft law is going to be discussed by the State Duma during the autumn session 2018. Of course, the draft will get changes. This will happen, especially likely if the government creates an “authorized federal body” for the state policy and regulation of integrated social and economic development of the Arctic as well as the “management company”, responsible for analytical support, monitoring and synchronization of the infrastructure construction work and investment projects in the support zones. These executive bodies of the federal government are interested in the law of action no less than the participants of the support zones’ projects, as they, together with the Interdepartmental Working Group on Socio-Economic Development of the Arctic, are responsible for the final result.

⁸ Vlasti Zapolyar'ya predlagayut dorabotat' zakon o razvitiy Arkticheskoy zony. [The Arctic authorities propose to complete the law on the development of the Arctic zone]. URL: <https://www.murman.ru/themes/arctic-05122017.shtml> (Accessed: 24 August 2018). [In Russian]

⁹ Pravovoj status Rossijskoj Arktiki ostayotsya razmytym. [The legal status of the Russian Arctic remains unclear]. URL: <https://www.murman.ru/themes/arctic-19062018.shtml> (Accessed: 24 August 2018). [In Russian]

If the adoption of a law is successful, i.e., it will not be rejected, but sent for revision, then its approval can be expected by the end of this year¹⁰. Meanwhile, the first stage of the pilot projects for support zones ends in 2020. Therefore, the applicants and participants of the three pilot projects defined by the government are concerned about the legislative uncertainty and the deadline for submitting applications. The worst variant for potential applicants is use of the requirements and the submitting procedure contained in the draft law. Such a scenario is the most probable, since the developers of the application requirements used the best management decision-making practices to get a complete set of projects for the support zone to be implemented. Although, it is not entirely clear what such a complicated procedure for approving applications is provided for. Projects in there have already passed through all types of examinations. E.g., meetings of the Interdepartmental Working Group, which decides on the application, “are held as needed, but at least once a year.” In our opinion, the assessment of the rationale for the “feasibility and effectiveness” of creating a base zone for the Arctic development can be performed by an authorized federal agency, since this function meets its intended purpose. It should be noted here that the indicators of the “feasibility and effectiveness” of the base zone are not specified in the draft law, therefore the fulfillment of this requirement may depend on the subjective opinion of the authorized federal agency.

This is especially important for projects of mineral resource centers, since the procedure for the examination of feasibility studies for developing fields or building new and expanding existing mining industries takes 2–3 years. Moreover, the expiration date of the examination is not defined, i.e., it is unclear when it should be repeated. Due to the fact that the use of the best available technologies is an economically and environmentally sound requirement for Arctic field development projects and the creation of new industries on their basis, chances to be included in the list of pilot projects decreases sharply. This problem can be solved only after the legislatively established transition of enterprises to new technological standards will be completed (in 2019–2021), i.e., at the second stage of the support zones formation.

The Government of the Murmansk region, as the applicant of pilot projects, does not agree with the total cost of the anchor project proposed by lawmakers, which should not be less than 100 billion rubles, and if it is less, then the project is not even accepted for consideration¹¹. In our opinion, in case of pilot projects for support zones, the cost of the main part of the project is not reasonable to be indicated at all, especially since the government, when deciding on the area for a pilot project is guided by their national economic and regional importance — economic development of the country and the Arctic.

¹⁰ Закон об опорных зонах в Арктике отложен до конца года. [The law on support zones in the Arctic has been postponed until the end of the year]. URL: <https://www.murman.ru/themes/arctic-06072018.shtml> (Accessed: 24 August 2018). [In Russian]

¹¹ Власти Заполяр'я предлагают доработать закон о развитии Арктической зоны. [The authorities of the Arctic areas offer to refine the law on the development of the Arctic zone]. URL: <https://www.murman.ru/themes/arctic-05122017.shtml> (Accessed: 24 August 2018). [In Russian]

On the other hand, the participants of the support zones will receive preferences if the territory of the support zone or a part of it will be recognized as “territories with preferential conditions for doing business”. In this regard, it is logical to consider only large investment projects that will make a significant contribution to the accelerated social and economic development of the of a particular area of the Russian Federation and the creation of comfortable living conditions for the population. It should be noted that the preferential conditions for doing business in the support zones have not yet been established. It is only assumed that they will be the same as for the zones of projected economic development.

Mineral resource center development projects differ from the other projects by the fact that the other projects (planned or implemented) in the support zones do not depend on their implementation.

The set of documents included in the application for most of the mineral resource center projects is exactly the same as for the other projects. Also, a limit on the number for such projects has been set: at least three of them. In this regard, there is unjustified competition between the projects related to various sectors of the national economy or social infrastructure and equally reasonable and socially significant.

For mining projects, there is one more condition: the consideration of their applications by the Interdepartmental Working Group takes place “when such applications accumulate”. Among other things, the refinement of applications is impossible.

In case of the mineral resource center of the Kola support zone, the project “Kola Chemical and Technology Cluster” could become major, but this is only possible at the second stage of the support zone formation. The main condition for this will be the agreement of the mining and metallurgical companies of the Murmansk region to become investors and developers of the project.

In the draft law, the main idea is that the presence of an investor is important for the application for a support zone formation. Only 3 of the 14 mandatory application requirements could be independently fulfilled by the applicant, i.e., the authority of the Arctic territory of the Federation. The remaining 11 requirements of the application are impossible without a defined investor. E.g., par. 11 of the application: “provide a business plan for each project that is planned to be included in the support zone, incl. information on the planned investments, implementation dates and basic financial, economic and environmental indicators of the project, project investors info and (if similar projects have been previously implemented) their experience in implementing similar projects with comparable expenditures, prepared in accordance with the guidelines of an authorized federal agency. The business plan of the project should be accompanied by the financial statements of the project investors for the last three reporting years”¹². In our opinion, the financial statements of a potential investor for the past three years and notarized copies of the constit-

¹² Proekt federal'nogo zakona “O razvitií Arkticheskoy zony RF” [The draft federal law “On the development of the Arctic zone of the Russian Federation”]. URL: <http://docs.cntd.ru/document/555622319> (Accessed: 24 August 2018). [In Russian]

uent documents of potential participants of the support zone are redundant, especially for those investors who intend to create diversified productions.

In addition, the highest executive body of a subject of the Russian Federation must not only find a potential participant in the supporting zone, but also sign an “Agreement on the preparation of an application for the creation of a supporting zone”. In this document, the applicant is obliged to indicate the procedure for providing information to the potential participant to evaluate their participation in the investment project, and it should also determine the procedure for the allocation of costs between the parties for the preparation of the application. Additional documents are attached to investment agreements, which will specify the mutual relations of the parties, define their responsibilities for non-fulfillment of the specified conditions, and they also establish a schedule for the projects planned to be included in the support zone. By signing an additional agreement, the member of the support zone must also commit to contributing to the Project Support Fund of the Arctic in the amount of at least 20%, depending on the cost of the infrastructure created in the manner prescribed by the investment agreement. In fact, it turns out that the participants of the support zone, who have not yet received income from their activities, must pay for the infrastructure facilities constructed with the use of the federal and regional budgets.

Numerous requirements for a member of the support zone, incl. financial obligations, of course, do not contribute to attracting investors.

Search for investors remains the main problem for applicants. It is also due to other reasons. Particularly acute is the problem of finding an investor. Potential investors in areas with extreme climatic conditions and increased costs of all resources can only be a successful (profitable) and large private company interested in large deposits and raw materials or products that are in demand on world markets or have a steady upward trend of demand in the home market [9, Perein V.N.; 10, Goncharova L.I.].

In the Kola support zone, examples of large fields are: the Khabozersk olivine field for magnesia refractories and the quartz-feldspathic ores of Kuru-Vahar, i.e., the fields that have a developed dressing technology worked out by the scientists of the FITS KSC RAS Mining Institute.

The list of promising and studies fields of the Murmansk region is presented in Table 1. It does not include deposits of non-conventional types of resources, since they are relatively low studied and are under the “search-and-estimate work”.

Table 1

Perspective fields and deposits of the Murmansk region

Deposit	Ore/mineral	Location	Reserves	Exploration degree
Kurkenpachk	<i>Iron ore</i>	Monchegorsk district, Olenegorsky GOK district	C_1+C_2	Pre-explored
Kolmozero	<i>Rare earth pegmatites (lithium, beryllium, tantalum, niobium)</i>	Lovozerskiy district	$B+C_1+C_2$	Detailed exploration
Palmostundrovskoe			$B+C_1+C_2$	Detailed exploration
Vasin-Mylk			C_1+C_2	Pre-explored
Ohmylk				
Oleniy Ridge				

Deposit	Ore/mineral	Location	Reserves	Exploration degree
Neske-Vara	<i>Carbonatites (niobium, tantalum)</i>	Kandalaksha district Vuorijarvi massif	C ₁ +C ₂	Pre-explored
Tuhta-Vara	<i>Apatite-magnetite ores (phosphorus, iron, niobium, tantalum)</i>		259 mln tons of ore C ₁ +C ₂	Pre-explored
Sallanlatva	<i>Baritriderite carbonatites</i>	Kandalakshskij rajon	85 mln tons of ore C ₂ +P	Pre-explored
Afrikanda	<i>Perovskititano-magnetite ore</i>	Polyarnozorinskij rajon	A+B+ C ₁	Explored
Kejvy (5 mes-torozhdenij)	<i>Kyanite shales</i>	Lovozerskiy District, Kejvy	868 mln tons of ore B+C ₁ +C ₂	Pre-explored
Caginskoe	<i>Titanium, iron</i>	Lovozerskiy District	B+C ₁	Pre-explored
Alluajv (r.t. №1)	<i>Eudialytic ores (rare earths)</i>	Lovozerskie tundry	C ₁ +C ₂	Pre-explored
Saharjok	<i>Yttrium-zirconium ore</i>	Lovozerskiy District, zapadnye Kejvy	C ₂ +P	Pre-explored
Ploskogorskoe	<i>Amazonite</i>		120,357 t of vein mass C ₁ +C ₂	Pre-explored
Yauriyokskoe	<i>Molybdenum</i>	Kolskiy District	1,386 t Mo B+C ₁ +C ₂	Pre-explored

One could also find an investor for the development of groundwater deposits, which fits into the idea of the mineral resource center and the support zone, since the development of groundwater deposits serves as an infrastructure and also contributes to the interconnection of projects that are implemented in the support zone.

Due to the fact that most of the technologies used today are reservoirs and the sources of water intake for industrial purposes of mining companies are quickly polluted by discharges and become unsuitable for both industrial and drinking water supply, the development of groundwater deposits remains important for all industrial areas of the region.

On January 1, 2015, 51 fields of drinking and industrial groundwater with reserves of 403.20724 thousand m³/day were included in the state registration list in the Murmansk region. 32 deposits are exploited. Surface water dominates in the drinking water supply in the area. Groundwater accounts for only 4%.

Perspective and prepared for the industrial development of groundwater deposits in the Murmansk region are: the Nizhnetulomskoye field (the Kola district, the lower part of the Tulomy river basin, 10 km from Murmansk); the field of drinking groundwater "Malaya Belaya" (Apatity municipality, reserves — 30 thousand m³/day); the Yenskoye groundwater field (the valley of the Yona river, Kovdor district; household and drinking water supply of the Kovdor and the Kovdorsky GOK); Nivskoye groundwater field (Kanda-Laksha district, valley of the Niva river, reserves — 20.6 thousand m³/day for household water supply of Kandalaksha residents); groundwater deposit "Klyuchevoye" (Kirovsk municipality, household water supply of industrial facilities of JSC "Apatit",

reserves — 16.5 thousand m³/day); the underground water deposits “Vudyavrskoe” (Kirovsk, for household water supply of the Kirovsk and industrial facilities of JSC “Apatit”).

In our opinion, it is advisable to make the application requirements more flexible for both applicants and potential participants of projects, incl. the development of mineral resources. The main goal is to increase the number of potential investors.

Currently, the value of one-time payments for the use of subsoil is a significant obstacle for the investor to decide on the development of the field and the creation of a new or expansion of the existing production. E.g., the size of the start-up payment for an investor who wants to start developing the Khabozersk olivine deposit amounts to 360 million rubles.

In our opinion, it is advisable to draw up licenses for the use of subsoil without tenders and auctions for exploration and extraction of mineral resources or for geological exploration of the subsoil, exploration and extraction of mineral resources carried out under a combined license. This will significantly reduce the starting (one-time) payments.

An effective measure for all mining companies operating in the polar regions could become a temporary reduction in the starting payment rate from “at least 10%” of the mineral extraction tax amount calculated on the average annual design capacity of the mining company up to 5% (for example), as it is secured by regulatory acts for oil and gas industries.¹³

Drastic measures to reduce the start-up payments for subsoil, with the obligatory condition that the investor confirms the financial possibilities, could be: 1) delaying the start of payments in the third year after the development of the field; 2) payment of start-up payments in parts, starting from the third year of development of the field.

Interesting is the proposal of the draft law developers on granting the management company a support zone with the function of searching for investors (incl. foreign ones). However, the mechanism for this important function, especially for project applicants, is not defined. In our opinion, the management company should have the authority to guarantee specific measures of state support to potential investors. This will be a more effective for attracting investors than, for example, the fulfillment of such indicators of Subprogram: 1 “Formation of supporting development zones and ensuring their functioning”, 1.4. “The number of news reports on various topics related to the development of the Arctic zone of the Russian Federation” and 1.5. “The number of socially significant events held, incl. international, dedicated to the development of the Arctic” (cumulative).

Conclusion

¹³ Закон Российской Федерации от 21.02.1992 N 2395-1 (ред. от 30.09.2017) “О недрах”. Ст.40; Metodika rascheta minimal'nogo (startovogo) razmera razovogo platezha za pol'zovanie nedrami, utv. prika-zom Minprirody ot 30.09.2008 N 232 (v red. Prikazov Minprirody Rossii ot 14.05.2009 N 128, ot 27.04.2011 N 240, ot 22.06.2011 N 553, ot 03.02.2012 N 20, ot 30.12.2014 N 577, ot 17.03.2015 N 106).[The law of the Russian Federation of 21.02.1992 N 2395-1 (ed.of 30.09.2017) “On subsoil”. Art.40; Method of calculation of the minimum (starting) size of the one-time payment for subsoil use, approved. Order of the Ministry of Natural Resources 30.09.2008 No. 232 (as amended by Orders of the Ministry Natural Resources of Russia 14.05.2009 No 128; 27.04.2011 No 240, 22.06.2011 No. 553, 03.02.2012 No 20, 30.12.2014 No 577, 17.03.2015 No 106). [In Russian]

We believe that the formation of mineral resource centers in the support zones of the Arctic on the principles proposed by the Ministry of Economic Development of the Russian Federation will contribute to the achievement of the objectives of the “Strategy for the Development of the Arctic Zone of the Russian Federation and Ensuring National Security until 2020”.

During the formation of the mineral resource centers in the Arctic, an effective measure of the federal regulator may be a temporary reduction in the starting payment rate from at least 10% of the mineral extraction tax amount calculated on the average annual design capacity of the mining company to 5%.

Successful applications for the mineral development for the support zone, investment projects for the development of fields and new mining industries should correspond to a project management standard. When choosing the investor, regional authorities should evaluate the experience of a company in such projects and use the approach method.

It is also advisable to review the application requirements and to make them more flexible for both the applicant and potential participants of projects, especially, mining and resource development ones.

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Water transport in the European North of Russia: social significance, challenges and perspectives of development*

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Abstract. This article is devoted to the analysis of the water transport in the European North of Russia. Using the case of the Arkhangelsk Oblast, we present the main challenges and perspectives of river navigation development in light of the area's history and current situation. Our research shows that, historically, water transport has played an important role in the social and economic development of the Arkhangelsk Oblast and held a leading position in the transportation system. However, due to the transition to a market economy in the 1990s, river traffic lost its competitive advantages. The study presents statistical data showing the negative trends of the passenger inland water transport development. The lack of the state involvement in industrial management has led to the deterioration of the water transport quality and its infrastructure. Despite existing challenges, however, water transport still plays an important role in the socio-economic development of the Russian North. In recent years, various levels of government have discussed the revival of the river navigation and improvements in its use for regional development. The article discusses prospects for overcoming the existing negative trends in the development of water transport. The focus is made on its connection with the industrial development of the Arctic and the cultural potential of the region.

Keywords: *inland water transport, river navigation, social significance, the Arkhangelsk Oblast, European North.*

Introduction

One of the important conditions for social and economic development of the territories is the transport system availability. The leading transportation modes for passengers and cargos in Russia are road, rail, air and water. According to official data, more than 60% of cargo and passenger transportation is carried out by road, while water transport is no more than 2%¹. Despite such low indicators, navigation plays an important role for those regions of Russia where the density of railways and roads is low, or they are completely absent, but the inland waterways network is well developed [1, Filatov N.N., p. 76]. E.g., the Arkhangelsk Oblast. Its geographical feature is a large distance between the settlements and highways and railway system. Many residents of this area agree that "water transport in the navigation period is still the only way of communication with regional and district centers and has no alternative for the transportation of passengers and car-

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¹ Rossiya v cifrah. 2017: Kratkij statisticheskiy sbornik. [Russia in numbers. 2017. A Brief Statistic Collection] M., 2017. pp. 287-288. [In Russian]

go”². The obvious advantages of water transport include low shipping costs and low cost of maintaining waterways. Despite its profitability, in terms of passenger traffic, water transport is significantly inferior to road and rail. The industry has accumulated a lot of problems, incl. the poor condition of waterways, old ships, and the lack of port infrastructure. In this regard, recently, at various levels of government, the issue of increasing competitive advantages and efficient use of water transport for the social and economic development of territories has been discussed³.

A brief history of shipping in the Arkhangelsk Oblast

The geographical feature of the Arkhangelsk Oblast is the inextricable link between river and sea basins.⁴ Due to the dense network of river arteries, called “God's roads” in the Middle Ages were [2, Ilina L.L., p. 114], and their links with the White and Barents Seas, both internal (river) and external (sea) waterways have been developed in this area.

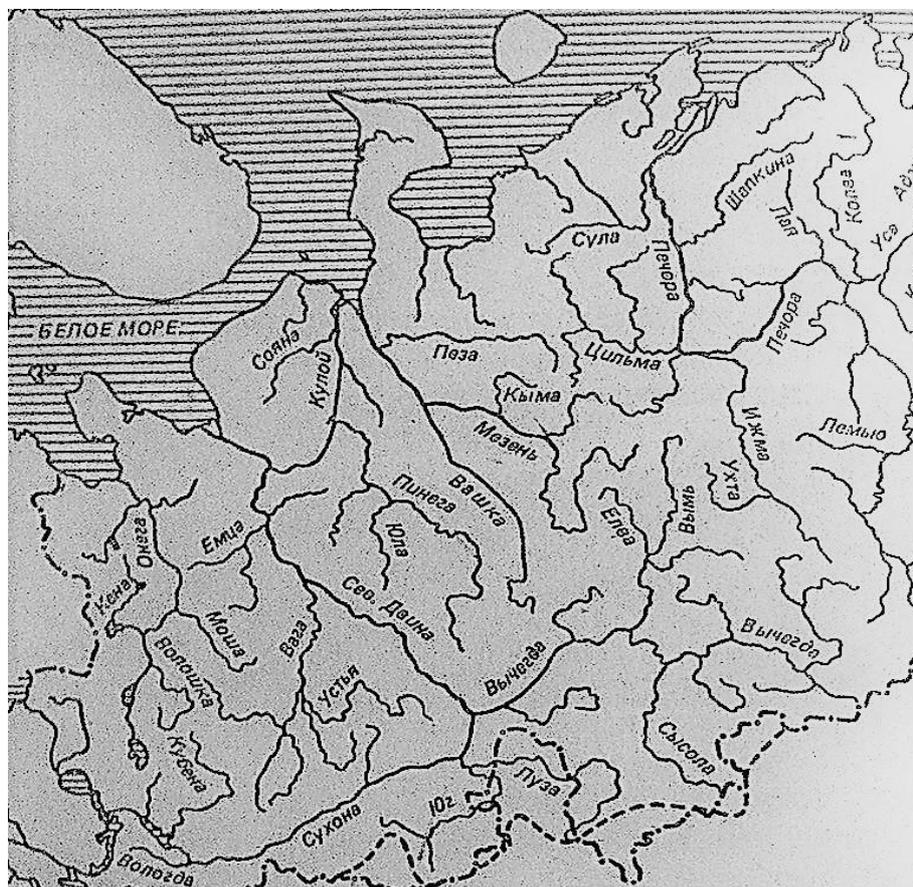


Fig. 1. Map of the river and sea basin of the Arkhangelsk Oblast [2].

² Deyatel'nost' vodnogo transporta. [Activity of water transport]. URL: <http://www.transport29.ru/vodnyj-transport/27-deyatelnost-vodnogo-transporta> (Accessed: 08 February 2018). [In Russian]

³ Soderzhaniye 1 km vodnogo puti obkhoditsya v 30 raz deshevle, chem avtodorogi. [The maintenance of 1 km of the waterway is 30 times cheaper than road]. URL: http://www.rostransport.com/news/13384/?sphrase_id=37386 (Accessed: 03 May 2018). [In Russian]; Gubernator Arkhangel'skoy oblasti podnyal vopros obmeleniya rek. [The governor of the Arkhangelsk Oblast raised the question of shallowing rivers] URL: http://www.rostransport.com/news/8052/?sphrase_id=37386 (Accessed: 03 May 2018). [In Russian]

⁴ Perevozki gruzov i passazhirov. [Transportation of goods and passengers] URL: http://www.morflot.ru/vvt/perevozki_gruzov_i_passazhirov.html (Accessed: 15 April 2018). [In Russian]

The length of the inland waterways of the Arkhangelsk Oblast is 3 443 km⁵. The main river highways pass along the rivers Northern Dvina, Mezen, Onega, and Pechora. Shipping is carried out in the White Sea with access to the seas of the Arctic Ocean: the Barents Sea and the Kara Sea.

These waterways have been used for several thousand years. The developed water network allows to move from one river to another and use them as means of communication [3, Vaganov P.F., p. 4]. In ancient times, waterways had a great importance for people. The development and settlement of new territories was going on along the northern rivers and seas. In the Arkhangelsk Oblast, on the banks of rivers and sea coasts, the first permanent settlements appeared. Their residents were engaged in crafts, handicrafts and trade along the inland waterways [4, Lukin Yu.F., p. 77]. In the 15th century, a regular trade connection with England, Holland and Germany was set via the White Sea.

The first passenger steamship route in the Russian North was opened in the 1860s. [5, Popov G.P. et al., p. 9], and in 1858 the regular navigation of steam vessels began [6, Arkhangelsk Oblast ..., p. 335]. Before the railway (it was built in 1899), inland water transport was the main means of transportation for passengers and cargo. The development of shipping stimulated the development of shipbuilding. In 1825, the first paddle steamer built at the Solombala shipyard was launched [5, Popov G.P., p. 6].

The development of rail transport and the expansion of the road network could not diminish the value of water transport. In the basins of the Northern Dvina, Pinega and Pechora rivers, a large part of the local forests was concentrated, and logging industry was operating there. The rivers were used for wood transportation [6, Arkhangelsk region ..., p. 57]. The growth of the logging industry lead to appearance of new settlements and towns [3, Vaganov P.F., p.8]. At the same time, the transport significance of the White Sea, which was used for export, increased. Regular passenger traffic on the White Sea appeared in the 1870s., but it was developing very slowly due to the small population of the seacoast [6, p. 340].

In the 1930–1990s, a modern water transport infrastructure was fully developed in Russia [7, Mustakaeva E.A., p. 140]. Regular shipping routes for passengers was carried out on sea and river vessels from the regional center and the main port – the city of Arkhangelsk – to the main settlements of the area. The delivery of goods was also carried out by the state on a regular basis through inland waterways in the navigation period and by sea transport throughout the year [8, p. 8, pp. 80–87]. Several shipyards in the area produced river-sea vessels. Volumes of freight transportation increased all the time. Most cargoes were logging industry products.

In many respects, the stable work of water transport was promoted by the state support of sea and river navigation and shipbuilding, which existed in the Soviet Union. After its collapse and the transition to a market economy, a sharp decline in traffic volumes was caused by a general decline in the production and consumption of industrial products. Many shipbuilding enterprises

⁵ Prot'yazhonnost' vnutrennikh vodnykh putey. [The length of inland waterways] URL: <http://opendata.morflot.ru/7707516988-ProtjagonnostVVP2012> (Accessed: 15 April 2018). [In Russian]

went bankrupt. Governmental regulation of passenger transportation and the export of industrial and food products was significantly reduced [8, pp. 8, 87, 222]. The dominant position in the water transportation was taken by the non-state sector.

Now, regular forms of vessel traffic are used for the shipping in the Arkhangelsk Oblast. This includes linear shipping, i.e. established directions of transportation and compliance with a certain mode of movement [9, Alekseeva E.S., p. 196]. The main inland waterways transport operator of the Arkhangelsk Oblast is OJSC “Arkhangelskiy Rechnoy Port”. The largest cargo delivery companies in the areas are OJSC “Northern Sea Shipping Company” and OJSC “Northern River Shipping Company”, which uses “river — sea” vessels⁶.

One river and five seaports operate in the Arkhangelsk Oblast: in the towns of Arkhangelsk, Onega, Mezen, and Naryan-Mar and in the village of Varandey⁷. River navigation is seasonal and limited to the period from May to October. In winter, navigation is carried out in the White Sea with the use of icebreaking assistance.

Challenges of the inland water transport in the Arkhangelsk Oblast

Years of market reforms and a decrease in state support led to a degradation of the water transport quality and a weakening of its competitive position in the country's transport system⁸. The industry has many problems.

First, the poor condition of the waterways. Northern rivers often form shoals and river sediments due to the deposition of sand and clay particles [6, p. 54]. Regular dredging is necessary to maintain stable navigation and increase water depths. Funding for these works is insufficient, despite the fact that water routes pass through natural river routes. Their construction requires fewer capital costs than the construction of railways and roads⁹.

Secondly, underdeveloped port infrastructure. Since the end of the 1980s, the modernization of the northern ports has not been carried out, and the bottom-deepening works have been significantly reduced [8, pp. 66–67]. As a result, most of the piers and wharfs are destroyed or require repairs to serve passenger and cargo ships. Passengers are disembarked to and embarked from unequipped shores¹⁰. It is worth noting that the underdeveloped port infrastructure is typical not only for Russia but also for other Arctic countries, e.g., Canada [10, Pashkevich A. et al., p. 236].

⁶ Deyatel'nost' vodnogo transporta. [Activity of water transport] URL: <http://www.transport29.ru/vodnyj-transport/27-deyatelnost-vodnogo-transporta> (Accessed: 08 February 2018). [In Russian]

⁷ Infrastruktura vodnogo transporta. [Infrastructure water transport] URL: <http://www.morflot.ru/glavnaya/intmap.html> (Accessed: 21 March 2018). [In Russian]

⁸ Gladkov G.L. Obespecheniye usloviy sudokhodstva na vnutrennikh vodnykh putyakh. [Gladkov G.L. Ensuring shipping conditions on inland waterways]. URL: http://www.rostransport.com/themes/16852/?sphrase_id=37386 (Accessed: 21 March 2018). [In Russian]

⁹ Soderzhaniye 1 km vodnogo puti obkhoditsya v 30 raz deshevle, chem avtodorogi. [The maintenance of 1 km of the waterway is 30 times cheaper than road]. URL: http://www.rostransport.com/news/13384/?sphrase_id=37386 (Accessed: 03 May 2018). [In Russian]

¹⁰ Deyatel'nost' vodnogo transporta. [Activity of water transport]. URL: <http://www.transport29.ru/vodnyj-transport/27-deyatelnost-vodnogo-transporta> (Accessed: 08 February 2018). [In Russian]



Fig. 2. Landing of passengers in one of the villages of the Arkhangelsk Oblast (Photo: Julia Olsen).

Thirdly, the “aging” of the fleet. The average age of the vessels is about 25 years. The river fleet built and existed since Soviet times is outworn significantly and often is not able to solve the transport problems of the population in some municipalities [8, p. 68]. In the Soviet Union, more than 40,000 vessels were registered in the Russian River Register, while today there are only 13,022¹¹. The renewal and expansion of the river fleet is not carried out almost. Ship automation systems do not meet modern requirements, and maintenance of ship mechanisms requires a large number of personnel¹².

Fourth, the seasonality of transportation and its availability only in the navigation period. The main problem for shipping in the North has always been the ice cover. Traditionally, the navigation period on the Northern Dvina River lasts 6 months, and on its tributaries, it is much less [11, p. 16]. In recent years, climatic changes have been observed. They affect the decrease in ice formation [12] and, as a consequence, an increase in the navigation period. In connection with the warm winters

¹¹ Krivoshey V. Vnutrenniy vodnyy transport: kak govornitsya, «priplyli»... [Krivoshey V. Inland water transport: as they say, “swam up” ...] URL: http://www.rostransport.com/article/16758/?sphrase_id=37386 (Accessed: 22 March 2018). [In Russian]

¹² Gladkov G.L. Obespecheniye usloviy sudokhodstva na vnutrennikh vodnykh putyakh. [Gladkov G.L. Ensuring shipping conditions on inland waterways]. URL: http://www.rostransport.com/themes/16852/?sphrase_id=37386 (Accessed: 22 March 2018). [In Russian]

and the late onset of the ice, there were cases when people were cut off from the “mainland”¹³. On the one hand, a change in the navigation time may contribute to the development of shipping and an increase in the volume of cargo and passenger traffic. On the other hand, the late onset of ice shortens the period of cargo delivery to remote areas along winter roads — roads that are laid on frozen rivers. In addition, climate changes adversely affect the coast and shoreline, leading to their degradation.

Fifth, the decline in state regulation of traffic and water transport management. In the Soviet years, there was a distribution of freight and passenger traffic, which allowed balancing the volumes of cargo-passenger traffic between all types of transport. Today, due to the lack of state regulation, water transport has been superseded by road and rail and it is used ineffectively. In addition, the decline in state participation in the management of the industry led to the transfer of half of the river infrastructure to private ownership, which led to problems of their maintenance and further development [13, Davydenko A.A., pp. 7–12]. E.g., the number of offices responsible for regulation and control of tourist transportation in the European North of Russia is 30 national, regional and local services. It affects the obtaining the necessary permits [10, Pashkevich A. et al., p. 232].

Social significance of the inland water transport

Economic reforms of the 1990s had a negative impact not only on the water transport itself, but also on the volumes of passenger-and-freight transportation. It was a result of a slowdown in the social and economic development of the Arkhangelsk Oblast. In the Soviet years, the logging was the basic industry of the areas. It provided jobs for the rural population and guaranteed a constant volume of passengers and cargo carried by water transport. In time of market reforms, most of the industrial enterprises of the area went bankrupt. It led to job cuts and a sharp decline in traffic volumes. The transition to a market economy and the absence of state regulation made the price for foodstuffs increase significantly [8, p. 62]. The delivery of goods was no longer carried out by the state, but by private entrepreneurs who set prices for their own benefit. The lack of developed industry and unemployment made the population to leave for large cities and regional centers. The demographic situation worsened. According to official data, since the late 1990s, the rural population has been constantly decreasing.

Negative demographic dynamics affected the volume of passenger traffic. Statistics show that the number of passengers transported by river had been decreasing annually.

Maritime transport is not in a better situation. In the Soviet years, the maritime transportation of passengers was carried out from the port of Arkhangelsk by the vessels “Tatariya”, “Bukovina”, “Ushar” and “Claudia Elanskaya” weekly. Currently the only company licensed for passenger transportation along the coast of the White sea is the company “Articreid”. Passenger transporta-

¹³ Karpovich P. Ledostav v Pomor'ye zaderzhivayetsya na 20 dney. [Ledostav in Pomerania is delayed for 20 days]. URL: <https://29.ru/text/gorod/378068158193664.html> (Accessed: 19 December 2017). [In Russian]; Agapov S. Toplaya zima izmenila zhizn' naseleniya ostrovnykh territoriy Arkhangel'ska. [The warm winter changed the life of the population of the island territories of Arkhangelsk]. URL: <http://нд29.рф/?р=140706> (Accessed: 15 January 2018). [In Russian]

tions are carried out to 11 settlements of the Arkhangelsk Oblast and Solovki islands with an interval of two weeks¹⁴.

Table 1

*Information about the number of rural population of the Arkhangelsk Oblast*¹⁵

Year	Number of rural population (thousand people)
1998	368,5
1999	359,9
2000	351,2
2001	343,3
2002	335,1
2003	334,5
2004	333,0
2005	322,6
2006	337,1
2007	327,7
2008	320,4
2009	313,7
2010	307,1
2011	297,3
2012	288,9
2013	281,5
2014	279,9
2015	272,5
2016	265,2
2017	259,3

Despite the existing problems for the Far North territories and equated areas, inland water transport still plays an important social role.

Table 2

*Information about the passenger carriage by inland water transport of the Arkhangelsk Oblast*¹⁶

Year	Number of passengers
2013	1,042,134
2014	925,354
2015	876,064
2016	861,414
2017	841,195

The research results show that 84% of the local population of the Arkhangelsk Oblast has been living on the coast for many decades [14, Podoplekin A.O., pp. 27–38]. Due to the geographical remoteness of many settlements and the lack of rail or road communications, water transport is the cheapest and most affordable way to deliver industrial goods, food and passengers. Today, regular inland passenger river transport covers 16 of the 19 districts of the Arkhangelsk Oblast: Velsky,

¹⁴ Ob utverzhdenii Transportnoy strategii Arkhangel'skoy oblasti do 2030 goda. Rasporyazheniye Pravitel'stva Arkhangel'skoy oblasti ot 15.12.2009 № 319-rp. [On approval of the Transport Strategy of the Arkhangelsk Oblast until 2030. Order of the Government of the Arkhangelsk Oblast, December 15, 2009 No 319-rp]. [In Russian]

¹⁵ Chislennost' i sostav naseleniya Arkhangel'skoy oblasti. [Population size and composition of the Arkhangelsk Oblast] URL: http://arhangelskstat.gks.ru/wps/wcm/connect/rosstat_ts/arhangelskstat/ru/statistics/population (Accessed: 15 March 2018). [In Russian]

¹⁶ The data provided by OJSC "Arkhangelsk River Port".

Verkhnetoemsky, Vilegodsky, Vinogradovsky, Kargopolsky, Kotlasky, Krasnoborsky, Lensky, Leshukonsky, Mezensky, Onezhsky, Pinezhsky, Plesetsky, Primorsky, Kholmogorsky and Shenkursky¹⁷.

In recent years, in a number of districts of the Arkhangelsk Oblast, increase in the demand for passenger transportation by sea have been observed. First of all, we are talking about areas with high recreational potential and tourism industry development prospects. On the territory of the Arkhangelsk Oblast, it is the Solovetsky Archipelago and its unique natural landscape, cultural, historical and spiritual sights. The Archipelago attracts a large number of Russian and foreign tourists. According to statistics, the number of people visiting Solovki by sea is constantly increasing. The exception was the summer season of 2017. Most of the passengers got to the village of Solovki from Karelia by sea vessels, based in the town of Kem. However, there is also a problem with the irregularity of sea transport. It is worth noting that the consequences of increased shipping and the number of tourists are both positive and negative. In scientific literature, these effects are considered on the example of the Canadian territories [15, Stewart E. et al.] and the Russian Arctic [16, Davydov A.N., Mikhailova G.V.].

Table 3

*Information about the number of passengers transported*¹⁸

Year	Number of passengers
2013	59,220
2014	62,678
2015	78,371
2016	74,427
2017	61,093

Prospects for the development of water transport in the Arkhangelsk Oblast

The problems of water transport are typical not only for the Arkhangelsk Oblast, but also for all Russia. The further social and economic development of the region largely depends on their decision.

Recently, at the state level, a number of long-term strategies have been adopted. They are aimed at a qualitative change in the water transport and lay the foundations for its effective development and its competitiveness. E.g., the Transport Strategy¹⁹ and the “Strategy for the Development of Inland Water Transport until 2030”. According to these documents, the strategic tasks are: solving systemic problems of the water transport, improving the quality of the waterways and technical conditions of shipping facilities, building new ships, increasing passenger traffic, incl. on

¹⁷ The data provided by OJSC “Arkhangelsk River Port”.

¹⁸ The data provided by the Agency for the Development of the Solovetsky Archipelago, Government of the Arkhangelsk Oblast.

¹⁹ Ob utverzhdenii Transportnoy strategii Rossiyskoy Federatsii na period do 2030 goda [On approval of the Transport Strategy of the Russian Federation for the period up to 2030 [Electronic resource]: approved by the order of the Government of the Russian Federation 22.11.2008. No. 1734-p. Access from referral-legal system “Consultant Plus”. [In Russian]

socially important routes, and developing freight transportation by internal and external waterways²⁰.

It is obvious that the future of strategic tasks and competitive advantages of water transport largely depend on economic and the social development of the region. Historically, rivers and seas have been used to develop natural resources of the North and trade relations with other areas of Russia and foreign countries. In the Soviet years, the transportation of passengers and cargo in the Northern Dvina and White Sea basins was carried by hundreds of different vessels and a single deep-sided water transport system was operating as well [6, pp. 335–341].

Today, the future development of the Arkhangelsk Oblast and the revival of sea and river shipping are largely related to the natural resource development and infrastructural development of the Arctic. It is assumed that the industrial development of the Arctic will lead to an increase in cargo turnover and shipping along the Northern Sea Route, incl. transit between Asian and European countries [17, Farre A. et al.]. In this regard, a promising idea is the creation of the Arctic Sea Highway of a year-round operation, which will include the Northern Sea Route and river communications²¹. In addition, recent climatic changes have contributed to the development of national and international shipping in the Russian Arctic [18, Meier W.N. et al., pp. 185–217]. This may cause an increase in the length of inland waterways, extension of navigation periods, establishment of regular sea and river traffic and, as a result, social development of coastal territories [19, Afonin A.B.].

One more promising idea is the development of river and sea tourism. In the North of Russia, culture is historically associated with the waters of the northern rivers. Historical places with great recreational potential are located along the rivers and seas of the Arkhangelsk Oblast: Solvychevodsk, Kargopol, Kholmogory, Voznesenie, the Solovetsky Archipelago, the Russian Arctic National Park, etc. The growing interest in the Arkhangelsk Oblast in Russia and among foreign tourists may increase the demand for the vessels and push the construction of new passenger vessels for tourist purposes [20, Grushenko E.B., pp. 1–6].

However, promising economic projects are not enough for the revival of the inland water transport in the area. According to the researchers, a complex social and economic assessment of the passenger transportation efficiency, the development of specific recommendations for solving problems of regulating the prices, fleet construction and the development of coastal infrastructure is necessary [21, Isaeva A.A., pp. 5, 26]. Solving these problems is not possible without state support, appropriate regulatory framework, regional and municipal water transport development

²⁰ Utverzhdena Strategiya razvitiya vnutrennego vodnogo transporta do 2030 goda. [The Strategy for the Development of Inland Water Transport until 2030 is approved]. URL: http://www.rostransport.com/news/11808/?sphrase_id=37386 (Accessed: 01 May 2018). [In Russian]

²¹ Strategiya razvitiya Arkticheskoy zony Rossiyskoy Federatsii [Development Strategy of the Arctic zone of the Russian Federation [Electronic resource]: approved by President of the Russian Federation 20.02.2013. Access from referral-legal system "Consultant Plus". [In Russian]

programs, federal funding for the maintenance of inland waterways, infrastructure and fleet, and state participation in various investment projects [22, Mustakaeva E.A.].

Conclusion

The development of water communications as a part of a single transportation system is an important condition for the social and economic development of the Arkhangelsk Oblast and improving the quality of life of the local population. Analysis of the inland water transport in the region has shown that today, both at the state level and at the level of the shipping companies, it is necessary to work on the improvement of the inland water transport, so it will correspond the current standards [23, Smirnov N.G., pp. 9–10]. This requires the implementation of existing strategies for the development of shipping, an increase in financing the maintenance of waterways and investments in the development of water transport infrastructure, which is possible by combining the efforts of the state and private business through public-private partnership.

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Arctic subsea communication cables and the regional development of northern peripheries*

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Abstract. Some years ago, the Arctic Ocean was still described as one of the last oceans that did not have subsea communications cables across it. This situation is now changing. One of the greatest increases in global data transfer is predicted to be traffic between Asia and Europe, and the Arctic Ocean offers a shortcut, making physical cable connections shorter and decreasing latency. Recent developments regarding two ongoing subsea communications cable projects (Quintillion and Arctic Connect), which aim to connect East Asia and Europe, are discussed, and the connection between these projects and regional development policies in Hokkaido and northern Finland are analysed. It is shown that the proposition that improved international connectivity through subsea communications cables could bring information-intensive industries into the region had been stronger in Finland. This is largely due to a lack of information and awareness concerning these projects among the regional actors in Hokkaido; however, no concrete policy or funding instrument has been developed in either of the case regions.

Keywords: *Arctic, subsea data cable, connectivity, regional development, Hokkaido, northern Finland.*

Introduction

This paper focuses on two case regions and two case projects. In addition to the northern peripheries of two developed countries with a high-level of technological knowledge, Hokkaido, Japan and northern Finland (including Lapland, Northern Ostrobothnia¹ and Kainuu) have also been mentioned as potential regions to be connected by a planned cable through the Northeast Passage. This is the Arctic Connect project, which originated in Finland but is international in nature and is continuing under the leadership of the mainly state-owned Cinia Group. The other case project is led by Quintillion Subsea Holdings, which has already installed a subsea communications cable around Alaska and is moving to Phase 2 of its project, i.e., installing a subsea communications cable between Alaska and Japan.

In this study, new Arctic subsea communications cable initiatives were investigated with a two-fold objective. First, the objective was to introduce the recent developments of two ongoing subsea communications cable projects that aim to connect East Asia and Europe. Second, the objective was to analyze the connections between these projects and the regional development policies in the northern peripheries. The latter objective was converted into the research questions regarding how much decision makers and regional developers know about the Arctic subsea communications cable initiatives; what types of attitude have been adopted; what types of possibilities have been recognized and which types of links regional developers perceive between sub-

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¹ In some occasions referred as the Oulu region.

sea communications cables and other regional development projects; and what types of resources regional decision makers utilize to allocate support to the Arctic subsea communications cable projects. In addition to contributing to an understanding of the infrastructure projects and policy making in the Arctic and northern regions, this study contributes to discussions concerning broadband policies. Grubestic and Mack recently argued that extant discussions on broadband and associated policies are overwhelmingly focused on broadband for personal use, and issues relevant to business adoption and the use of broadband are ignored [1, Grubestic T.H., Mack E.A., p. 7].

This research is based on published reports and policy papers, newspapers and other media sources, interviews and participatory observations. As a self-reflective remark, the author would like to note his role as a contributor to the Hokkaido-based discussion concerning the Arctic subsea communications cables; however, it is believed that active participation in the discussion does not nullify one's ability to analyze the policy making and knowledge exchange processes. This article consists of an introduction to the conceptual and theoretical discussion concerning the relation between an information and communication technology (ICT) infrastructure and regional development as well as a short description of the two main Arctic subsea communications cable initiatives. This is followed by an introduction to the broadband policies and ICT industry development in Hokkaido and northern Finland, an analysis of the approaches adopted for the possibilities of the Arctic subsea communications cable initiatives and concluding remarks.

Connectivity, information and communications technologies and regional development

Internet and broadband have been described both as gateway technologies and as general-purpose technologies. Thus, these technologies have fundamentally transformed the way both people and businesses operate and how and where economic activity is organized [2, Czernich N., Falck O., Kretschmer T., Woessman L., pp. 505–506; 3, Mack E.A., p. 5]. Considering their importance, it is not surprising that it has long been acknowledged that telecommunications technologies and related infrastructures are key factors upon which the competitiveness of firms, productivity and the comparative advantages of regions are critically dependent [4, Gillespie A., Williams H., pp. 1311–1312; 5, Capello R., Nijkamp P., pp. 7–8; 6, Cambini C., Jiang Y., pp. 559–560].

Still, the relation between ICTs and regional economies should not be oversimplified. For example, in the past two decades, contradicting analyses concerning the impacts of ICTs on the competitive positions of regional economies and firms' locational preferences have emerged. While echoing claims concerning the death of distance through the availability of high-quality telecommunications infrastructures, the so-called de-concentration school has predicted a relocation of firms from expensive and congested central city locations to suburban areas; however, the concentration school has suggested that ICTs would only reinforce the advantageous position of central urban areas. During its early history, the internet was conceived as a decentralizing and geography-free technology, but many researchers have claimed that because connections and bandwidth are unequally distributed, cyberspace is dependent on the real world's spatial realities and

that the internet has simply become another concentrated infrastructure layer supporting the existing hierarchies between regions. Furthermore, it is assumed that the availability of ICT solutions will not nullify the importance of face-to-face conversations and that the forces of agglomeration economies will draw firms to central locations, such as where knowledge spillovers are more likely and labour markets are more heavily concentrated. In other words, the drivers of industrial clusterisation are not overruled by the presence of modern ICTs. The third and currently dominant approach predicts more heterogenous impacts of ICTs on firm locations based on firm and industry-specific characteristics [7, Malecki E.J., Wei H., p. 362; 3, Mack E.A., p. 6; 1, Grubestic T.H., Mack E.A., pp. 122–124].

In addition to recognizing the continued importance of location, attention must also be focused on the significance of connectivity. Namely, it has been claimed that even remote geographical locations with multiple peering points (i.e. possibility to exchange traffic between administratively separate internet networks), abundant power infrastructures and a concentration of diverse fibre backbones are attractive to data or information-intensive industries. At the same time, the local presence of industries, such as data centers, can generate a significant demand for telecommunications services and can contribute to regional development by spurring infrastructure investments even when the local residential demand is at a relatively low level [3, Mack E.A., p. 24; 1, Grubestic T.H., Mack E.A., pp. 125, 131]. Similarly, the high-speed internet via a broadband infrastructure may further facilitate macroeconomic growth by accelerating the distribution of ideas and information, fostering competition and increasing the development of new products and processes [2, Czernich N., Falck O., Kretschmer T., Woessman L., p. 505].

While these types of conclusions from the academic literature may seem promising from the perspective of the economic revitalization of remote regions, it is not clear whether they are known, accepted and shared among policy makers. The policy cycle is a relatively simple model that describes complex policy making processes and divides them into a series of stages (for example: agenda setting, policy formulation, legitimation, implementation, evaluation, termination). While understanding that this model is not offered as theory explaining or predicting behavior and recognizing the numerous ways to label different stages, this study borrows from the vocabulary of the policy cycle to construe the steps different regional stake holders have taken vis-à-vis the Arctic data cable initiatives [8, Bridgman P., Davis G., pp. 99–100; 9, Cairney P., pp. 32–34].

The Arctic subsea communications cable initiatives

The Russian Optical Trans-Arctic Submarine Cable System (R.O.T.A.C.S.) project, which was launched in 2000, was the first serious attempt to connect northern Europe and East Asia with a subsea fibre optic cable through the Arctic Sea. The project was led by the Russian company Polarnet, which planned to connect Tokyo and London. Despite receiving approval from the Russian Intergovernmental Commission for Information and Communications Technologies in October

2011 as well as financial support from the Ministry of Telecommunications in January 2013, the project did not materialize [10, Delaunay M., p. 504]².



Fig. 1 The Arctic Submarine Communications Cable Projects (Quintillion and Arctic Connect)³

Black line: Arctic Connect, planned route; Orange line = Quintillion, planned route; Red line: existing Quintillion (Alaska) and Cinia (Finland-Germany) submarine communications cables; Dotted line: planned Bothnia Bay submarine communications cable line and planned terrestrial connection through Finland.

At the beginning of the 2010s, Arctic Fibre emerged as the second major Arctic subsea communications cable initiative. This project was developed by a Canadian company with the same name. The aim was to create a nearly 16,000-kilometre subsea fibre optic cable connection between Asia and Europe through the Northwest Passage. The new system was also expected to

² Arctic Economic Council Telecommunications Infrastructure Working Group, "Arctic Broadband. Recommendations for Interconnected Arctic" 2016, 25, Interview with Suvi Linden, Vice Chairperson, NxtVn (Oulu, Finland, 23 May 2017).

³ This map is a rough estimate based on the material published by Quintillion and Cinia. Rather than describing the actual routes, branching units and cable landing stations, it describes the general ideas of these large-scale projects.

improve connections to remote communities in Canada and Alaska [11, Starosielski N., pp. 16–18]. The implementation of the project became possible, though after Quintillion Subsea Holdings, based in Anchorage, Alaska, acquired Arctic Fibre's assets and became the company that would build and operate the system. Quintillion itself is a privately-owned business incorporated in 2012⁴. Quintillion's project is divided into three phases. The construction of Phase 1, which involved a system that includes the subsea communications cables around Alaska and new terrestrial cables, has been completed and is in service. Decisions concerning the Phase 2 project, i.e. installing a subsea communications cable between Alaska and Japan, are expected to be made soon. While the illustration on Quintillion's homepage designates Tokyo as the location of the Japanese end of the cable, according to a representative, the question concerning the planned landing site in Japan is currently under consideration⁵.

The re-emergence of the project to install a subsea communications cable through the Northeast Passage is based on an initiative taken by Finland. For example, while a January 2015 report on sustainable development in the Scandinavian Arctic that was commissioned by the Prime Minister's Office in Finland lacks reference to such a cable, the roots of the project are visible in the March 2015 report, which was commissioned by the Confederation of Finnish Industries and written by Paavo Lipponen, the former Prime Minister of Finland. This document designates a communications cable from Asia to Europe along the Northeast Passage and through Finland as a particularly important project for Finland⁶. Two months later, the Ministry of Transport and Communication commissioned the report 'Technical-Economic Study on the Northeastern Passage Undersea Cable' from Petri Hyyppä of Proceed Consulting Ltd and Stan Kramer of the David Ross Group. According to the report on 26 October 2015, the geographical location of Finland provides an advantage in attracting investments, such as data centers and other digital infrastructures, from major internet players and content providers. The project was strongly connected to the Baltic Sea cable (C-Lion1), which was under construction at that time. The existing backhaul fibre connections within Finland were considered enough for a diversified connection up till southern Lapland; however, the need for further improvements in the northern routings was acknowledged⁷.

The Ministry of Transport and Communications commissioned another report concerning the prerequisites for international cooperation to initiate the Northeast Passage telecommunica-

⁴ Phone interview with Kristina Woolston, Vice President, External Relations, Quintillion (Sapporo, Japan, 9 March 2017); S. Downing Quintillion CEO out, new one in, as project nears completion. *Must Read Alaska*. 04 August 2017 URL: <http://mustreadalaska.com/quintillion-ceo-new-one-project-nears-completion/> (Accessed 19 December 2017).

⁵ Phone interview with Woolston (n 11); Quintillion, Quintillion Completes Installation of Historic Alaska Subsea Fiber Optic Cable System. 24 October 2017, Press release; Quintillion, Quintillion Names Interim CEO. URL: <http://qexpressnet.com/quintillion-names-interim-ceo/> (Accessed 19 December 2017).

⁶ Prime Minister's Office: Growth from the North. How Can Norway, Sweden and Finland Achieve Sustainable Growth in the Scandinavian Arctic. Report of an Independent Expert Group. 20 January 2015 Prime Minister's Office Publication 4/2015; Lipponen P. *A Strategic Vision for the North: Finland's Prospects for Economic Growth in the Arctic Region*. Confederation of Finnish Industries, 2015. pp. 7, 9, 23, 26.

⁷ Hyyppä P., Kramer S. Teknistaloudellinen Selvitys Koillisväylän Merikaapelin Toteutumisedellytyksistä. *Liikenne- ja Viestintäministeriö*. 26 October 2015.

tions cable project from Paavo Lipponen and Reijo Svento, the former CEO of the Finnish Federation for Communications and Teleinformatics on 2 May 2016. Their final report, which was delivered on 10 November 2016, states that the underwater fibre cable connection (about 10,500 km from Japan and China to Kirkenes in Norway and Kola peninsula in Russia) would make it possible to implement a fast telecommunications route from Asia to northern and central Europe because the new cable would be connected to the Baltic fibre cable connection between Helsinki and Rostock. The report also indicated that the project would be broad and multinational. The implementation would require commitments from at least Russia, China, Japan, Norway and the relevant EU countries⁸. The Finnish government has expressed its support to the Arctic Connect project in various international and home forums since the release of the report. While the Ministry of Transport and Communications organized an international high-level bureaucratic meeting for representatives of different countries related to the Arctic Connect project in March 2017⁹, Cinia Group holds the primary responsibility for the advancement of the project and the establishment of a separate project organization that is to carry out the development phase (for example, legal structuring and permitting, project marketing, financial model, environmental studies, technical solutions and business plan for the implementation process), which is expected to last from 2017–2019. After the implementation phase, the cable system should be completed by the early 2020s. While the plans concerning the routes of the cable system and the locations of the landing stations on the western end of the connection are already openly discussed, plans concerning the East Asian end are expected to become more detailed in the spring of 2018. The same can be said of the planned landing in Alaska, which was added to the project relatively recently¹⁰.

National broadband policies and the regional ICT industry in Hokkaido, Japan and northern Finland

Globally known assessments, such as the International Telecommunication Union's ICT Development Index and the World Economic Forum's Networked Readiness Index, indicate that Japan and Finland offer an advanced environment for the development of ICT, and the key stakeholders in both countries are willing and capable of utilizing the possibilities offered by the ICTs;¹¹ however, research concerning broadband policies in Finland and Japan includes contradicting conclusions. Bauer concluded in 2010 that fiscal and industrial policy programs, such as tax incentives, subsidies, public-private partnership and government investments, had been widely used histori-

⁸ Lipponen P., Svento R. *Report on the Northeast Passage Telecommunications Cable Project. Summary*. Ministry of Transport and Communications. 25 November 2016.

⁹ Interview with Aleksii Härkönen, Ambassador in Charge of Arctic Affairs, Ministry for Foreign Affairs, Finland and Riitta Gerlander, Desk Officer, Ministry for Foreign Affairs, Finland (Helsinki, Finland 3 March 2017); Email from Marjukka Vihavainen-Pitkänen to author (10 March 2017).

¹⁰ Conversation with Jukka-Pekka Joensuu, Executive Advisor, Cinia (Sapporo, Japan, 17 October 2017); Cinia. *Arctic Connect: Submarine Cable System*, 2018.

¹¹ ITU. ICT Development Index 2017. URL: <http://www.itu.int/net4/ITU-D/idi/2016/#idi2016rank-tab> (Accessed: 21 December 2017); World Economic Forum. Networked Readiness Index. URL: <http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/> (Accessed: 21 December 2017).

cally but were scaled back in most countries with the onset of liberalization and privatization. He cited South Korea, Japan and the Nordic countries as examples of nations that have been firmly committed to liberalization but that retained a strong complementary role for the public sector even before the economic downturn of 2008, after which many other countries reconsidered the role and importance of state intervention through public broadband programs [12, Bauer M., pp. 65–66]. While Bauer combined all Nordic countries, Eskelinen, Frank and Hirvonen found differences between the broadband policies of Finland and Sweden. According to their findings, Sweden launched its national ICT infrastructure programme in 2000 and assumed an interventionist stance relying on the public sector. On the other hand, Finland published its broadband strategy, which emphasized the role of markets and technological neutrality, in 2003 [13, Eskelinen H., Frank L., Hirvonen T., pp. 413, 415–416].

Meanwhile, the Broadband 2015 project was launched in December 2008 as a resolution of the Finnish Government. The aim of the project was to ensure that fast broadband networks in the areas where their commercial availability was unlikely. The goal of the programme was that by the end of 2015, more than 99% of users would have access to a 100Mbps broadband connection within two km of their permanent place of residence or place of business. The total amount of public funding available was 130 million euro, including state aid and funding from municipalities and from the EU Rural Development Programme for Mainland Finland.¹² Although this project did not achieve its aims by the end of 2015, similar types of activities have continued. Furthermore, compared to most Arctic regions, the existing broadband situation in northern Finland is favorable¹³.

The Japanese Government has also been active in promoting broadband services. The IT Strategy Headquarters was established based upon the IT Basic Act in 2001. For broadband infrastructure deployment, competition policies have been key issues from the beginning. In 2003, the government expanded its e-Japan Strategy, which had existed since 2001, to stimulate the spread of broadband, especially to non-profitable areas, with programs providing a combination of subsidies, tax incentives and low or zero-interest loans for broadband operators. Then, the u-Japan Policy and the New IT Reform Strategy were successively introduced in 2004 and 2006, respectively, to increase broadband expansion and network enhancement. As in Finland, the next target was set in 2015. The i-Japan Strategy 2015 was established in July 2009 and aimed for a nationwide 100 Mbps for mobile and 1 Gbps for fixed-line broadband by 2015 [6, Cambini C., Jiang Y., p. 561]¹⁴.

¹² Finnish Communications Regulatory Authority. Fast Broadband Project Brings Ultra Fast Internet to Sparsely Populated Areas. URL: <https://www.viestintavirasto.fi/en/steeringandsupervision/broadband2015.html> (Accessed: 18 December 2017).

¹³ The Arctic Council. Task Force on Telecommunication Infrastructure in the Arctic. Telecommunications Infrastructure in the Arctic: A Circumpolar Assessment, 2017. pp. 51–59.

¹⁴ IT Senryaku Honbu, 'i-Japan 戦略 2015～Kokumin Shuyaku no 「Dejitaru Anshin・Katsuryoku Shakai」 no Jitsugen wo Mezashite～Towards Digital Inclusion & Innovation' (6 July 2009); Ministry of Internal Affairs and Communications, National Broadband Policies: 1999–2009, Japan. URL: http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/presentation/pdf/091019_1.pdf (Accessed: 21 December 2017).

As far as the existing ICT industry is considered, significant differences can be observed between different areas within northern Finland and Hokkaido. The region around the city of Oulu forms the greatest population center in northern Finland, and it is also the home of a major ICT industry cluster. Around the turn of the millennium, Oulu was considered one of the largest wireless telecommunication technology research and development centers worldwide. While the problems of Nokia, the 'engine company' of the region, and the changes it made in its strategy concerning mobile phone business in the late 2000s and the first half of the 2010s revealed the structural weaknesses of the highly specialized Oulu-based high technological sector, the past few years have witnessed an increasing diversification of the ICT industry, the emergence of new service-oriented businesses and a reconstruction of the regional innovation collaboration system [14, Oinas-Kukkonen H., Similä J., Pulli P., p. 272; 15, Salo M., pp. 83–85, 87, 97–98; 16, Simonen J., Koivumäki T., Seppänen V., Sohlo S., Svento R., pp. 289–293, 298–301, 303]. At the same time, Oulu has become home to the 5G test network and many actors involved in IoT-related business¹⁵. Despite the existence of the ICT industry, northern Finland lacks an ICT infrastructure, such as sub-sea fibre cables and large-scale data centers. Although the CSC (IT Centre for Science) data center is in Kajaani (the Kainuu region)¹⁶, northern Finland has not been as successful as northern Sweden (especially the Luleå-Boden area) in its attempts to attract international and home businesses data centers. The biggest data center investments in Finland, such as a Google data center in Hamina, have been made in the southern part of the country.

While the service sector, primary production and foodstuff industries, and recently the tourism industry, have played dominant roles in the Hokkaido economy, the ICT industry has a significant role as well. The historical roots of policies aimed toward the promotion and concentration of knowledge-intensive, high-tech companies in Hokkaido date back to the 1980s, and the 1990s witnessed the emergence of the Sapporo Valley concept, which was used to describe the Silicon Valley-type accumulation of high technology startups in Sapporo, usually within close proximity to Hokkaido University [17, Hokkaidō Jōhō Sangyōshi Henshū linkai; 18, Yamada S., pp. 318–321]. Connections were also built between Hokkaido and northern Finland, as the Oulu region and especially its ICT cluster became an important benchmarking case concerning the successful incubation of industrial clusters. The close cooperation lasted approximately a decade beginning in the mid-1990s [19, Saunavaara J., pp. 130–132]. Despite the recent positive indications, high expectations concerning the development of the ICT industry in Hokkaido have not materialized. One rec-

¹⁵ University of Oulu. Experimental 5G Research. URL: <http://www oulu.fi/university/node/46729> (Accessed: 12 April 2018); University of Oulu. CWC Introduces Olympic Visitors to the Future 5G/ URL: <http://www oulu.fi/cwc/node/44399> (Accessed 12 April 2018); Mitzner D. Oulu, the World's Northernmost Tech Hub is Making a Comeback. The Nordic Web, 28 November 2016. URL: <https://thenordicweb.com/oulu/> (Accessed: 12 April 2018); DNA. Oulussa On Maailman Kovin IoT-Yhteisö. URL: <https://www.dna.fi/yriyksille/blogi/-/blogs/oulussa-on-maailman-kovin-iot-yhteiso> (Accessed: 12 April 2018).

¹⁶ Lapland Chamber of Commerce, *Arctic Business Forum Yearbook 2017*. Lapland Chamber of Commerce, May 2017. Pp. 103–104; Renforsin Ranta. Companies of Renforsin Ranta. URL: <http://www.renforsinranta.fi/companies> (Accessed: 18 December 2017).

ognized reason for the relatively moderate development is the lack of an engine company that would have pulled others toward success in its wake. The lack of a strong local ICT industry has also been accompanied by a shortage of ICT infrastructures. While most of the international subsea communications cables land in the area near Tokyo, which also hosts a large majority of data centers and servers in Japan, only one international subsea communications cable reach to Hokkaido, connecting Japan's northernmost island with the island of Sakhalin¹⁷. Still, based on new strategy papers or issues raised as the main themes of events concerning the economic development of these regions, it can be concluded that the growing importance of issues such as IoT, AI and digitalization in general have been recognized in both northern Finland and Hokkaido¹⁸.

Different approaches to the possibilities linked to the cables

Some years ago, the Arctic Ocean was still described as one of the last oceans that was not crisscrossed with subsea communications cables [10, Delaunay M., p. 503]. This situation is now changing — not least because one of the greatest growth rates in global data transfer is predicted for traffic between Asia and Europe, and the Arctic Ocean offers a shortcut, making the physical cable connection shorter and decreasing latency. Nevertheless, the attention paid to and interest in the improved connectivity through the Arctic has not been equal in both ends of the planned connection.

Level of awareness

It is necessary to be aware of the Arctic communications cable initiatives before any connections between them and the development of any region can be envisioned. Similarly, an issue or problem has to be identified before it can be placed on the political agenda. Therefore, it is important to mention the major differences in awareness concerning the Arctic subsea communications cables. Questions concerning the Arctic Connect and its direct and indirect effects became openly debated and widely recognized issues in Finland after the Lipponen-Svento report was released. While the Finnish government has promoted this initiative both in home and international arenas, it has also been indirectly connected to Finland's chairmanship in the Arctic Council through the focus on connectivity¹⁹. The Arctic Connect initiative is also dependent on northern

¹⁷ Cloud Network Infrastructure Workshop. Gurōbaru—Kuraudonettowaakusu Kenkyūkai kara no Hokkaidō—Nihon—Sekai he no Teigen [Senryakuteki Hikari Kaitei Keeburu ni yoru Gurōbaru Keizai Inobeeshon], 16 May 2014. pp. 1–2; Interview with Tsuyoshi Yamamoto, Professor, Hokkaido University (Sapporo, Japan, 27 January 2017).

¹⁸ See, e.g.: Interview with Mika Riipi, County Governor, Regional Council of Lapland (Rovaniemi, Finland, 6 June 2017); BusinessEXPO. 31st Hokkaido Business Expo. URL: <http://www.business-expo.jp/content/> (Accessed: 18 December 2017); City of Sapporo. Sapporo-shi IoT Inobeeshon Suishin Konsōshamu Kaiin Kigyō Boshū. URL: <http://www.city.sapporo.jp/keizai/top/topics/it/iotlab.html> (Accessed: 19 December 2017).

¹⁹ See, e.g.: Lehti A.E. *Sipilä Tapaa Huomenna Medvedevin – Neuvottelupöydässä Isot Investoinnit' Kauppalehti*, 8 December 2016. URL: https://www.kauppalehti.fi/uutiset/sipila-tapaa-huomenna-medvedevin--neuvottelupoydassa-isot-investoinnit/A3cA4X2b?ref=iltalehti:9123%253Futm_source&utm_medium=boksi&utm_campaign=AlmaInternal&_ga=1.148081909.332578641.1398684574 (Accessed: 19 December 2017); Staalsen A. Sipilä, Medvedev Discuss Trans-Arctic Cable. *The Independent Barents Observer*, 9 December 2016. URL: <https://thebarentsobserver.com/en/arctic/2016/12/sipila-medvedev-discuss-trans-arctic-cable> (Accessed: 19 December 2017); Virtanen J. Pääministeri Sipilä Lensi Lentokoneen Tromssaan ja Paljasti Suomen Arktisen Iskulauseen: Jos Se Toimii Suomessa, Se Toimii Kaikki-

Norway, where it has been discussed²⁰. Signs of the wider cross-border regional approach can also be seen, such as in the joint declaration supporting the Arctic Connect from the chambers of commerce of Lapland, Oulu, Troms and Swedish Lapland²¹. Meanwhile, the Quintillion project has received surprisingly little if any visibility in Finland despite its similarity to the Arctic Connect project²².

In the case of Hokkaido, the discussion concerning the Arctic subsea data cables remained almost non-existent for some time. When the Northwest Passage cable project was still led by Arctic Fibre, the company openly acknowledged Hokkaido as a potential landing site in Japan. The Cloud Networks Infrastructure Workshop, which was established in 2010, was chaired by Professor Yamamoto Tsuyoshi from Hokkaido University and was comprised of representatives from various ICT companies, prepared its own plan proposing a new subsea communications cable connecting Hokkaido with the main island in 2014. The working group also incorporated the Arctic Fibre initiative into its proposal²³. Representatives of the Hokkaido government were also aware of and participated in the process that led to the publication of the proposal²⁴; however, the proposed project did not materialize, and the connection with Arctic Fibre faded. While interest among the Hokkaido-based experts waned, or at least the project was placed on hold, the public discussion never began. A study of the *Hokkaido Shinbun* — the leading newspaper in Hokkaido — archives revealed only one article from May 2014 that mentions Arctic Fibre. This article discusses Professor Yamamoto's submission of a plan to the governor of Hokkaido to develop Hokkaido as a base for an international communication infrastructure. Furthermore, searches in the archives of some of Japan's major national newspapers have not revealed any articles that discuss the Arctic subsea communications cables²⁵.

alla' Helsingin Sanomat, 23 January 2017. URL: <https://www.hs.fi/ulkomaat/art-2000005057297.html> (Accessed: 19 December 2017).

²⁰ Nilsen T. Trans-Arctic Fiber Cable Can Make Kirkenes to High-Tech Hub. *The Independent Barents Observer*, 4 December 2016. URL: <https://thebarentsobserver.com/en/industry-and-energy/2016/12/trans-arctic-fiber-cable-can-make-kirkenes-high-tech-hub> (Accessed: 19 December 2017).

²¹ Rautajoki T. Lapland Chamber of Commerce, Kristian N. Sørheim Nilsen Troms Chamber of Commerce, Wallin S., Swedish Lapland Chamber of Commerce, and Tuovinen J. Oulu Chamber of Commerce. Arctic Connect – Arctic Cooperation for a New Digital Highway to Asia.

²² Neither the Lipponen-Svento nor the Hyypä-Kramer report refer to Quintillion, Arctic Fibre or Alaska. When the author conducted searches on the homepages of one national (Helsingin Sanomat) and two regional (Kaleva and Lapin Kansa) newspapers on October 2, 2017, search term “Quintillion” did not reveal any article referring to the company or its project. Simple Google searches combining words “Quintillion”, “Arctic Fibre”, “datakaapeli” (data cable in Finnish), “merikaapeli” (sea cable in Finnish) reveal only a very few blog postings from private citizens.

²³ Cloud Network Infrastructure Workshop. Gurōbaru—Kuraudonettowaakusu Kenkyūkai kara no Hokkaidō—Nihon—Sekai he no Teigen [Senryakuteki Hikari Kaitai Keeburu ni yoru Gurōbaru Keizai Inobeeshon], 16 May 2014, pp. 4, 13, 22.

²⁴ Group interview with Tomoyuki Nakata, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Satoko Chaya, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Hiraku Okabe, Director, Office of International Business, Hokkaido Government and Yoshinao Okabe, Chief Coordinator, Office of International Business, Hokkaido Government (Sapporo, Japan, 12 October 2017).

²⁵ Hokkaidō Shinbun. Kokusai Tsūshin Infura Dōnai ni Kyoten Seibi wo' Hokkaidō Shinbun (Sapporo, 27 May 2014), p. 4; These searches were conducted by research assistant Fukuda Chizuru in February and March 2017.

On the other hand, some traces of the submitted proposal can be found. The Hokkaido government's new vision for Hokkaido, published in August 2015, for example, referred to the ICT corridor project derived from the 2014 proposal.²⁶ The Hokkaido Prefecture's policy paper concerning the Northern Sea Route — a topic which has strongly dominated discussions concerning the Arctic region in Hokkaido — was compiled by the Office of Logistics and Ports in February 2016, and it briefly refers to the subsea communications cables that could be laid in the Arctic waters²⁷; however, when the author interviewed the representatives of the same office in April 2017, they were not aware of any ongoing discussion concerning this issue within the Hokkaido government. Some of them had, however, heard about the Finnish interest in the cable project when visiting Helsinki as a part of a larger delegation in August 2016. Similarly, Arctic Fibre was the only initiative that was familiar to the representatives of the Industrial Promotion Division and Office of International Business in September 2017. They were neither aware that Arctic Fibre had merged with Quintillion nor aware of the recent developments of the project²⁸.

The discussion concerning the Arctic communications cables and their possibilities for Hokkaido showed signs of revival in the spring and summer of 2017. Besides the speeches given in home seminars, Hokkaido's position in relation with the Arctic subsea communications cables gained some visibility during the 2nd Top of the World Arctic Broadband Summit organized by the Arctic Economic Council in cooperation with Business Oulu on 14–15 June 2017. The international seminar 'Arctic Data Cables, Digitalization and Regional Development', which was held in Sapporo on 17 October 2017, introduced the current stage of the Arctic Connect project and discussions concerning data centers and connectivity to the different stakeholders in Hokkaido. Furthermore, it can be expected that these questions will attract some media attention at the end of June 2018, when the 3rd Top of the World Arctic Broadband Summit will be organized in Hokkaido.

Attitudes, recognized possibilities and links with other regional development projects

In the case of Finland, the link between the Arctic subsea communications cables and other ICT-related projects has been strongly emphasized for years. The strategy for northern Finland, which was announced by the four northernmost regions in Finland already in August 2014, brought the Northeast Passage submarine data cable connection forward as a possibility that might attract data center investments in northern Finland²⁹. The more recent reports commissioned by the Ministry of Transport and Communications concerning the cable connection and

²⁶ Hokkaido Government. Shin – Hokkaidō Bijon Suishin Hōshin, August 2015. p. 76.

²⁷ Hokkaido Government. Hokkyoku kaikōro no rikatsuyō ni muketa hōshin, 2016. p. 26.

²⁸ Group interview with Tomoaki Kagawa, Chief Coordinator, Office of Logistics and Ports, Hokkaido Government, Kuniaki Suzuki, Councillor, Office of Logistics and Ports, Hokkaido Government, Noriyuki Shirato, Deputy Director, Office of Logistics and Ports, Hokkaido Government (Sapporo, Japan, 18 April 2017); Group interview with Tomoyuki Nakata, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Satoko Chaya, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Hiraku Okabe, Director, Office of International Business, Hokkaido Government and Yoshinao Okabe, Chief Coordinator, Office of International Business, Hokkaido Government (Sapporo, Japan, 12 October 2017).

²⁹ Pohjois-Suomen Neuvottelukunta. Uusi Pohjoinen – Suunta Suomelle! 27 August 2014. p. 35.

statements from different politicians and key actors representing the regional developers all refer to data centers, digital infrastructure investments and other business opportunities related to digitalization. Interviewees representing regional developers of northern Finland have emphasized the link between the Arctic Connect project and the ongoing discussion concerning the possibility to connect Finland with the Arctic Ocean through a railway connection between northern Finland and Norway. In other words, Arctic Connect and Arctic Corridor could be viewed as parts of a plan to establish a logistical corridor through which both cargo and data could travel. They have also emphasized the potential symbolic meaning of the Arctic Connect that could pave the way for the railway connection between Finland and Kirkenes³⁰. At the strategical level, Arctic Connect has already been incorporated into the Transport and Logistic Strategy of Northern Finland, and to some extent, it has been incorporated into the new regional development programs of the three northern counties³¹.

The Regional Development Programme for Kainuu focuses most attention on the importance of the planned submarine communications cable connection between Europe, northern Finland and Asia. Whereas this document emphasizes this project's importance to Kainuu and envisions new data centers and investments from Asia to the region, the other regional programs make weaker references to the Northeast Passage communications cables and data centers. Kainuu's primary interest most likely reflects the regions existing involvement in data center businesses. The plan concerning Lapland mentions the subsea communications cable along with the Arctic railway as the future connecting elements between East Asia and Europe; however, discussions concerning the latter play a much larger role in the document. The parts concerned with digitalization do not refer to infrastructures, such as subsea communications cables or data centers. Although the ICT industry and issues such as 5G, IoT and AI play highly significant roles and despite the importance of accessibility and connectivity, which are recognized along with the Arctic possibilities in the new Regional Development Programme for Northern Ostrobothnia, neither subsea communications cables nor data centers are clearly mentioned in the document³². According to an informant, the wording of the document does not refer to a lack interest in the submarine cables. However, the Regional Council seems to have a more natural role to play in the advancement of

³⁰ Hyyppä P., Kramer S. Teknistaloudellinen Selvitys Koillisväylän Merikaapelin Toteutumisedellytyksistä. *Liikenne- ja Viestintäministeriö*, 26 October 2015. pp. 10–11; Lipponen P., Svento R. Report on the Northeast Passage Telecommunications Cable Project. Summary. Ministry of Transport and Communications, 25 November 2016. pp. 4, 6; Interview with Timo Lohi, Development Manager, Region of Northern Lapland (Kemi, Finland, May 18, 2017); Interview with Mika Riipi, County Governor, Regional Council of Lapland (Rovaniemi, Finland, 6 June 2017).

³¹ Interview with Mika Riipi, County Governor, Regional Council of Lapland (Rovaniemi, Finland, 6 June 2017); Liikennevirasto, 'Pohjois-Suomen Liikenne- ja Logistiikkastrategia' (15 August 2017); Lapin Liitto, 'Lappi-Sopimus. Lapin Maakuntaohjelma 2018–2021' (November 2017); Kainuun Liitto, 'Kainuu-ohjelma. Maakuntasuunnitelma 2035, Maakuntaohjelma 2018–2021, Luonnos 3.10.2017' (3 October 2017); Pohjois-Pohjanmaan Liitto, 'Pohjois-Pohjanmaan Maakuntaohjelma 2018–2021' (2017).

³² Lapin Liitto. Lappi-Sopimus. Lapin Maakuntaohjelma 2018–2021, November 2017. pp. 19–20, 30–35, 42; Kainuun Liitto. Kainuu-ohjelma. Maakuntasuunnitelma 2035, Maakuntaohjelma 2018–2021, Luonnos 3.10.2017 (3 October 2017), p. 20; Pohjois-Pohjanmaan Liitto. Pohjois-Pohjanmaan Maakuntaohjelma 2018–2021, 2017. pp. 6–8, 19–20.

national broadband projects within their own region³³. Meanwhile, the authorities of the city of Oulu, which hosted the EU Arctic Stakeholder Forum in June 2017, have utilized the visibility gained through the event and promoted the importance of trans-Arctic data cable connection between Europe and Asia to the European Commission³⁴. One of the most recent expressions of interest and support was issued in January 2018 when the cities of Oulu and Rovaniemi and the Kainuu region committed themselves to the planning of the terrestrial cable route through northern Finland in cooperation with Cinia³⁵.

In the case of Hokkaido, a specific support scheme has been developed to attract new data center investments to the island. Data centers have been recognized as one of the target industries within the framework of subsidy programs based on the Hokkaido Industry Promotion Ordinance, and they are also mentioned in the current Hokkaido Comprehensive Development Plan inaugurated in 2016³⁶. The activities, which aim to attract data center businesses, began in the late 2000s and are based on an understanding of Hokkaido's advantageous position when compared to other regions in Japan. Namely, the cold climate, small risk of earthquakes or tsunamis and availability of land at reasonable prices have been considered assets compared to home competitors. As the price of electricity is a major constraint of international competitiveness and because the energy prices in Hokkaido have been above the national average since the shutdown of the Tomari nuclear power plant, expectations have been higher than the actual outcomes. Namely, new large-scale data centers have not been established in Hokkaido since 2011, when Sakura Internet built one of Japan's largest data centers in Ishikari³⁷.

While attempts to invite new data centers are mainly focused on home actors, the completion of the document 'Proposal for the Establishment of a Data Centre in Hokkaido' in June 2017 could be an indication of the more international approach that was mentioned during an interview. This document, which was prepared by the prefectural government, cites the three municipalities Ishikari, Tomakomai and Bibai as the most promising locations for new data centers in Hokkaido and emphasis their municipality-level financial support programs for data center investments.

³³ Interview with Jussi Rämetsä, Planning Director, Council of Oulu Region (Oulu, Finland, 5 March 2018)

³⁴ European Commission. Summary Report of the Arctic Stakeholder Forum Consultation to Identify Key Investment Priorities in the Arctic and Ways to Better Streamline Future EU Funding Programmes for the Region, 2017. pp. 8–9.

³⁵ Cinia. Koilliväylän Datakaapelista Virtaa Pohjois-Suomen Maakuntien Elinkeinoihin. URL: <https://www.cinia.fi/arkisto/koillivaylan-datakaapelista-virtaa-pohjois-suomen-maakuntien-elinkeinoihin.html> (Accessed: 12 April 2018)

³⁶ Group interview with Tomoyuki Nakata, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Satoko Chaya, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Hiraku Okabe, Director, Office of International Business, Hokkaido Government and Yoshinao Okabe, Chief Coordinator, Office of International Business, Hokkaido Government (Sapporo, Japan, 12 October 2017); Committee for the Promotion of Investment in Hokkaido, Hokkaido Business Location Guidebook, As of March 2016, March 2016. p. 29.

³⁷ Cloud Network Infrastructure Workshop. Gurōbaru—Kuraudonettowaakusu Kenkyūkai kara no Hokkaidō—Nihon—Sekai he no Teigen [Senryakuteki Hikari Kaitei Keeburu ni yoru Gurōbaru Keizai Inobeeshon], 16 May 2014. pp. 15–17, 22; Kaihatsu Kōhō. Deeta Sentaa Ricchi ni okeru Hokkaidō no Kanōsei—Sakura Intaanetto no Keiken kara. Kaihatsu Kōhō, 2014. 14(9), pp. 20–21, 24; Ministry of Land, Infrastructure, Transport and Tourism. Hokkaidō Sōgō Kaihatsu Keikaku, March 2016; Interview with Tsuyoshi Yamamoto, Professor, Hokkaido University (Sapporo, Japan, 27 January 2017).

Nevertheless, the attempts to promote Hokkaido as an attractive location for data centers have not involved international subsea communications cables since the Arctic Fibre initiative³⁸.

Allocated resources

While funding schemes and subsidiary programs, for example, would be clear examples of resource allocation, the lack of such policy instruments does not necessarily imply the lack of interest. Despite the role of the public sector in the broadband policies mentioned, both academic experts and representatives of the Hokkaido Prefectural Government have emphasized that the construction of subsea communications cables is outside the traditional domain of the public sector. In other words, a small number of companies hold the decision-making power and capability to implement such processes in Japan³⁹. Therefore, even if regional and local actors viewed the improvement of connectivity as a method to improve the attractiveness to data center companies, financial support for the subsea communications cable projects would not be easily accessed. While the Japanese approach towards subsea data cables is not exceptional, as they have always been mainly private ventures in different parts of the world [7, Malecki E.J., Wei H., p. 366], other types of examples exist. For example, it has been reported that China's Ministry of Industry and Information Technology and state-owned China Telecom Corporation are participating in discussions related to the Arctic Connect⁴⁰. This is not surprising, as China has included the Arctic in its Belt and Road Initiative, and state-owned Chinese actors have played significant roles in different infrastructure projects in the Arctic⁴¹.

The existence of various statements and strategy papers supporting the advancement of the Arctic Connect project can be considered an indicator of the shared understanding among the regional developers and economic interest groups in northern Finland; however, the leading role of private enterprises has also been mentioned by Finnish regional actors and representatives of the national government. While expressing their support for the projects, regional actors have a quite limited if any role to play, such as in the funding of the Arctic subsea communications cable project. Their role could be much larger, such as in the case of a subsea cable that is planned to be

³⁸ Hokkaido Government. Department of Economic Affairs. Proposal for the Establishment of Data Center in Hokkaido, June 2017; Group interview with the representatives of the Hokkaido Government Office of International Business and Industrial Promotion Division (Sapporo, Japan, 12 October 2017).

³⁹ Interview with Tsuyoshi Yamamoto, Professor, Hokkaido University (Sapporo, Japan, 27 January 2017); Group interview with Tomoyuki Nakata, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Satoko Chaya, Chief Coordinator, Industrial Promotion Division, Hokkaido Government, Hiraku Okabe, Director, Office of International Business, Hokkaido Government and Yoshinao Okabe, Chief Coordinator, Office of International Business, Hokkaido Government (Sapporo, Japan, 12 October 2017).

⁴⁰ Shi T. 10,000 Kilometers of Fiber-Optic Cable Show China's Interest in Warming Arctic. *BloombergPolitics*, 14 December 2017. URL: <https://www.bloomberg.com/news/articles/2017-12-13/undersea-cable-project-shows-china-s-interest-in-warming-arctic> (Accessed: 18 December 2017).

⁴¹ Pettersen T. Russia and China Sign Agreement on Belkomur Railroad. *Barents Observer*, 4 September 2015. URL: <http://barentsobserver.com/en/business/2015/09/russia-and-china-sign-agreement-belkomur-railroad-04-09> (Accessed: 11 April 2018); Yamal LNG. About the Project. URL: <http://yamallng.ru/en/project/about/> (Accessed: 11 April 2018); The State Council Information Office of the People's Republic of China. China's Arctic Policy. URL: http://engli.sh.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm (Accessed: 11 April 2018).

built from southern Finland to Bothnian Bay. This new cable is planned to connect the Oulu and Tornio regions in Finland and possibly also the Luleå region in Sweden with the existing cable system between Finland and Germany. The Bothnian Bay cable project is highly relevant from the perspective of the Arctic Connect project, as these planned subsea communications cables would eventually be connected with each other through a terrestrial connection. At the same time, the Bothnian Bay cable may be dependent on the willingness of local governments and local businesses to invest in landing stations, for example. The public authorities have already supported this plan in 2015, when the Centre for Economic Development, Transport and Environment (ELY Centre) of North Ostrobothnia paid half of the investigation that was conducted by a private consulting firm⁴².

The activities of local actors in the Hanko area can also be used as an example of local actors' capabilities. The local enterprises and municipalities of Hanko and Raseborg (with a combined population only around 40,000) aimed to create a significant node for international data traffic and hoped to attract new data centers to the area. Therefore, they established C-Fibre Hanko Ltd. and gathered 3 million euro to create a new branch connection for the C-Lion1 subsea data cable in Hanko. To the best of the author's knowledge, similar types of activities have not emerged, at least not yet, in northern Finland.⁴³

Conclusion

The Arctic subsea communications cable projects are ICT infrastructure projects that can be approached from different angles. Borrowing Catherine Middleton's words, they could be supported as enablers of the Information Age and the knowledge economy [20, Middleton C., p. 9]. While there are regions in the Arctic where even a discussion concerning internet access as a basic human right is valid due to a lack of any or proper connections⁴⁴, these projects seem to appear to be mainly potential business cases both in northern Finland and Hokkaido, where broadband is already widely available. In other words, regional developers' attention mainly focuses on these projects' capabilities to bridge the two global economic centers via a new connection through the Arctic; however, this type of approach does not nullify the fact that the Quintillion project has enabled fast and feasible broadband services for many remote communities in Alaska, and it may

⁴² Elinkeino-, Liikenne- ja Ympäristökeskus, Pohjois-Pohjanmaan ELY-keskuksen Yritysrahoituskatsaus, Loka-joulukuu 2015. URL: <https://www.ely-keskus.fi/documents/10191/8852023/Pohjois-Pohjanmaan+ELY-keskuksen+rahoituskatsaus+IV.pdf/c524511b-5cbb-4bc4-bc1e-b1cb5bf324e9> (Accessed: 11 April 2018); Business Oulu. Perämeren Kaapelista Elinvoimaisuutta ja Kilpailukykyä Pohjoisille alueille. URL: <https://www.businessoulu.com/fi/uutiset/perameren-kaapelista-elinvoimaisuutta-ja-kilpailukyky-pohjoisille-alueille.html> (Accessed: 13 April 2018).

⁴³ Interview with Suvi Linden. Vice Chairperson. NxtVn. (Oulu, Finland, 23 May 2017); Cinia. Cinian ja C-Fiber Hanko Oy:n Uusi Tietoliikennetyhteys Kiihdyttää Liiketoimintamahdollisuuksia. URL: <https://www.cinia.fi/arkisto/cinian-ja-c-fiber-hanko-oy-n-uusi-tietoliikennetyhteys-kiihdyttaa-liiketoimintamahdollisuuksia.html> (Accessed: 19 December 2017); Cinia. A New Cinia Connection Links The Hanko Area Directly to International Data Networks. URL: <https://www.cinia.fi/en/archive/a-new-cinia-connection-links-the-hanko-area-directly-to-international-data-networks.html> (Accessed: 19 December 2017).

⁴⁴ More about this discussion, see e.g.: United Nations General Assembly. Human Rights Council. Report of the special Rapporteur on the Promotion and Protection of the right to Freedom of Opinion and Expression, 16 May 2011. A/HRC/17/27.

serve a similar type of role later in northern Canada. Similarly, the Arctic Connect project may become a major advancement in the availability of broadband services in the Russian Far North. Still, these projects do not necessarily easily apply to the traditional broadband policy context of Finland and Japan, where the focus has often been on spreading services to remote areas within national borders.

When comparing these two regions, it can be concluded that the proposition that improved international connectivity through subsea communications cables could bring information-intensive industries to the region has been stronger in northern Finland; however, the regional actors in Hokkaido have also shown interest in the information they have recently received. Based on the vocabulary of the policy cycle model, it can be concluded that a policy issue has been identified and that a stage of agenda setting has been reached at least in northern Finland⁴⁵. The current approach — supporting in principle but without major economic involvement — may either reflect the outcome of the policy analysis and policy formulation processes or the ongoing natures of the processes. While the wide support that the Arctic Connect enjoys in Finland may indicate a relatively smooth legitimation process, the lack of information concerning the policy instruments and their economic impacts makes it difficult to predict the potential course of consultations between different interest groups. Furthermore, when the possibility of actions on behalf of the sub-state actors is considered, attention should focus on the characteristics of potential actors. In other words, while a prefecture or a county, for example, may have more resources or greater experience in large-scale development projects than a single municipality, it may lack the possibilities, rights and incentives to act. Therefore, municipalities, which often are landowners, actors in charge of the land use zoning and geographically smaller entities surrounding a potential landing station, may eventually become the key regional players, as the Hanko-Raseborg example shows.

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⁴⁵ Bridgman and Davis (n 8) pp. 99–100; Cairney (n 9) pp. 32–34.

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POLITICAL PROCESSES AND INSTITUTIONS

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Property and government interests of Russia under globalization: the Arctic case*

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Abstract. Modern processes of the global property and governance formation are contradictory combined with the preservation and reproduction of economic interactions within the framework of individual States, regions and inter-state relations. The actualization of these processes in the Arctic region is due to its transformation into a place of focus and the most acute manifestation of the new contradictions between globalization and nation — state interests. The author concluded that the implementation of the Russian Arctic strategy is complicated by the uncertainty of prospects and the variation of possible vectors of the new globalization. The article substantiates the need for drastic measures to strengthen the Russian position in the Arctic due to the current strengthening of regionalization and fragmentation of the world economy. The geo-economic and geopolitical configuration of international cooperation in the Arctic may change in the near future due to the transition from of a unipolar to a multipolar model of the world order and the growing threats of a new hybrid cold war. It's shown that the contradictions between the Arctic powers are complicated against the background of the desire of the non-Arctic countries to participate in the exploitation of the region's resources. The author reveals the issues related to the search of the optimal balance between the objective imperatives of globalization and the protection of nation — state and regional interests of Russia as the largest Arctic power.

Keywords: *globalization of property, global governance, global contradictions, global political economy, crisis of globalism, multipolarity, regionalization, glocalization, the Arctic, the Arctic resources, the Northern Sea Route, interests of Russia.*

Introduction

At the present stage of development of the world civilization, one of the most acute contradictions is the contradiction between globalization and existence of nation-states. The depth and role of this contradiction, the diverse and comprehensive nature of its influence on social relations in the modern world are due to the objective nature of the factors and patterns of globalization, and the need for state-organized forms of economic and political interactions. The objectivity of these phenomena and, at the same time, their heterogeneity, multidirectionality, and (in some substantive and functional respects) opposites, give a rise to the issue of protecting nation-state interests in the context of expanding globalization, which by its nature not only genetically indifferent about these interests, but in many cases opposes them.

At the same time, the globalization of production forces and the reproduction process as a whole becomes a key. We observe an expanded reproduction of global value chains that constitute the material basis for deepening economic globalization [1, Lukyanov S., Drapkin I., pp. 16–17]. It is essential that the Russian economy is not only deeply integrated into global value chains,

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but also plays a prominent role in their reproduction, being, according to the ECB, among the six most significant participants in these processes and ahead of the integrative influence of the UK France, Italy and all the BRICS countries except China¹. Since the production process that forms the global value chains takes place, as a rule, within the TNCs framework, it enhances their global role, contributes to the transformation of the largest TNCs into global corporations. The latter are now transformed into the main modern form of primary economic activity (more precisely – an integrative industrial, scientific, financial and commercial complex). At the same time, these processes increase the contradiction between the orientation of global corporations towards the unification of production and commercial due to functioning in the “world without borders”, on the one hand, and the national-state discreteness of the world economic system, on the other. In the current system of geo-economic and geopolitical relations, the Arctic turns into a region of localization of the most significant forms and mechanisms of the global contradiction [2, Pilyasov A.N., pp. 16–21; 3, Lukin Yu.F.; 4, Martin-Nielsen J., pp. 51–68].

State interests in the globalization of the production process, property and management relations

The transformation of value chains into the leading production form of economic globalization (along with globalization forms of financial and informational nature) leads to a transformation of the competition mechanisms and modifying the criteria for competitiveness of subjects of world economic relations. Today, it is not the competition of goods or even technology that is becoming increasingly important, but the struggle for a place in the functional hierarchy of links in global value chains, since the economic agents that determine the scientific impulses that regulate financial security and that produce the largest share of production gain the greatest influence on the value added in global chains of its creation. From this perspective, Russia's position in the world economy is much less advantageous than the quantitative indicators of its involvement in global value chains, since these indicators, reflecting the actual dependence of the world economy on Russian energy, also show obvious localization on the lower functional parts of the processes of creating value added, and consequently, the insignificance of the share in the appropriation of global profits.

Nevertheless, when the repeatedly formulated tasks of economic diversification and the development of knowledge-intensive high-tech industries are far from being resolved, further efficient reproduction of the energy sector remains vital for the Russian economy and the Russian state. It is especially relevant, since it seems increasingly difficult to reach northern deposits and continental shelf requires increasing high-tech support [5, Tatarkin A.I., Zakharchuk E.A., Loginov V.G., pp. 4–13]. In addition, the growth of world trade contributes to the strengthening of the spatial communication and their high-tech modification. Both home and geo-economic processes,

¹ Bleyman N. Dostich peredela: novyye strategii rossiyskikh eksporterov [Reach redistribution: new strategies of Russian exporters]. URL: http://rostov.rbcplus.ru/news/5ac0c53e7a8aa921ec8fc54a?utm_source=rbc&utm_medium=mainplus&utm_campaign=790950-5ac0c53e7a8aa921ec8fc54a (Accessed: 24 June 2018).

combined with current geopolitical trends, have sharply increased the role of the Russian Arctic and northern territories, their strategic importance for the development of the Russian economy and state. International contradictions are aggravated. They are not only caused by disputes of the coastal Arctic states [6, Lukin Yu. F.; 7, Bartenstein K., pp. 264–280], but also by claims from dozens of other countries of the world to participate in the exploitation of the Arctic resources. It is obvious that the global warming increases the number of claims and contributes to the formation of prerequisites for global conflicts². The offshore fields of the Arctic Ocean account for a quarter of the world's hydrocarbon reserves. The controversy over their economic development is becoming more and more dangerous due to destabilization and chaos of international relations, the crisis of the global model and the nation-state sovereignty renaissance, new hybrid cold war, strengthening the regionalization and fragmentation of the world economy, neoprotectionism and distribution of various glocalization models for economic and other social interactions³. At the same time, one of the peculiarities of economic globalization trends is the complication of interaction, cooperation and competition among the Arctic states against the background of increasing economic and military presence in this region of non-Arctic countries, especially China and the UK.

The problems, prospects and contradictions of the development of the Arctic region in the discourse of global political economy are primarily determined by the growing tendencies of globalization of property relations and economic management [8, Cohn Th., pp. 21–35; 9, Eletsy N.D., Kornienko O.V., Chap. 2–4]. The expanding economic development of the Arctic occurs when, on an objective basis of the globalization of the productive forces, an increasing number of production resources, factors and results of production acquire the status of objects of globalized property. In some cases, economic realization and legal fixation of this status acts in direct and open forms, which refers, in particular, to the use of the marine resources outside the economic zones of coastal states, to the resources of Antarctica and space, and to the use of economic information of global networks. International treaties (as a rule, under the UN) regulate the exploitation of globally significant resources and define a mechanism of their use (as they are the objects of global property). The administrative system, created to monitor compliance with these treaties, is transformed into instrument of global economic management. Section 8 (Ice-covered areas) of the

²Apanasenko V. Novaya mirovaya vojna mozhet nachat'sya v Arktike [New World War can begin in the Arctic] *Nezavisimoye voyennoye obozreniye*. 23.11.2012. URL: http://nvo.ng.ru/gpolit/2012-11-23/1_artic.html (Accessed: 24 June 2018) [In Russian]; Zabelin I. Severnyy morskoy put' — novoye yabloko razdora mezhdru Rossiyey i SSHA v Arktike. [The Northern Sea Route - a new apple of discord between Russia and the USA in the Arctic]. URL: https://apral.ru/2018/04/19/severnyj-morskoy-put-novoye-yabloko-razdora-mezhdru-rossiej-i-ssha-v-arktike.html?utm_referrer=https%3A%2F%2Fzen.yandex.com (Accessed: 24 June 2018) [In Russian].

³Shimberg A. Bor'ba za Arktiku [Shimberg A. Fighting for the Arctic]. URL: https://regnum.ru/project/fight_for_the_arctic (Accessed: 24 June 2018) [In Russian]; "SSHA usilyat bor'bu za resursy Arktiki" — glava Pentagona. ["The United States will strengthen the struggle for Arctic resources" - the head of the Pentagon]. URL: <https://regnum.ru/news/2437543.html> (Accessed: 24 June 2018) [In Russian]; SSHA sozdayut sobstvennyy ledokol'nyy flot. [The US creates its own icebreaking fleet]. URL: <https://theworldnews.net/ru-news/ssha-sozdaet-sobstvennyy-ledokol-nyi-flot> (Accessed: 24 June 2018) [In Russian]; Komrakov A. London zayavil pretenzii na Arktiku. [London claims to be the Arctic]. URL: <http://www.yktimes.ru/london-zayavil-pretenzii-na-arktiku/> (Accessed: 24 June 2018) [In Russian].

UN Convention on the Law of the Sea (1982) is of particular importance for the Arctic region⁴ as well as the activities of the Arctic Council⁵ and global activities of the Nordic Council, Northern Forum, Conference of Parliamentarians of the Arctic Region and some ecological organizations [10, Lagutina M.L., Kharlampyeva N.K., pp. 64–83; 11, Vylegzhanin A.].

More diverse are the indirect forms of globalization of property relations. They are manifested, e.g., in climate agreements (according to which the establishment of restrictions and quotas for harmful emissions actually means the recognition of general atmospheric and other resources as property of all mankind); sectoral global agreements (e.g., quoting of production volumes within OPEC, the volume of global revenues as the economic exercise of ownership right for oil); and especially, the assignment of factors and results of production by global corporations that implement the economic exercise of global property ownership in discrete forms of sectoral and functional corporate appropriation. These indirect forms of globalization of ownership relations reflect the transitional character of the modern economy that generates historically fundamentally new economic phenomena in the social environment of the previous modes of production. In particular, at the early stages of the global property formation, this process occurs within the framework of the historically preceding mechanisms of private appropriation (state, corporate, sectoral, group, etc.), although the real subject embodying its essential social nature is humanity. But the full development of new forms of ownership is a long and controversial process due to the change of the balance of interests among the subjects of global interactions.

Regional specificity of the globalization of property contradictions and management in the Arctic

The immaturity of the forms of globalized property at the early stages of its genesis also gives rise to historically specific forms of economic contradictions caused by the desire of individual actors to exercise their private interests to the detriment of the other actors' interest under the pretext of personifying the global expediency, efficiency and global interests. In this case, individual states, corporations, regional integration groups and other structures, international organizations and other private social actors may claim control or direct appropriation of resources of other subjects, disguising their private interests with formulations about the interests of all humanity, which they supposedly represent. Contradictions about the economic development of the Arctic resources are becoming increasingly dangerous in the context of destabilization and chaos of international relations, the crisis of the globalism that has emerged so far, the renaissance of the nation-state sovereignty, the increasing regionalization and fragmentation of the world economy, neoprotectionism and existence of various models of globalization of economic and other social interactions. At the same time, under the pretext of protecting universal human interests, only a redistribution of income goes on, due to the exploitation of global resources, from one pri-

⁴ UNCLOS URL: http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_r.pdf (Accessed: 24 June 2018). [In Russian]

⁵ Arctic Council. URL: <http://arctic-council.org/index.php/en/> (Accessed: 24 June.2018).

vate entity to another⁶, and this is not always optimal from the point of view of global economic efficiency, and even more — integrative social and economic efficiency, not to mention the almost formalized criteria of justice.

Meanwhile, as we know, it is the arguments about justice that have become the basic argument of foreign geopolitics in their attempts to question the legitimacy of Russia's ownership of the Arctic and Northern territories. The “equitable freedom of access” to globally significant resources are linked to the transfer of those resources under “international control”, which could, in fact, mean only the absence of any restrictions on the predatory arbitrariness of TNCs and states dominating the governing apparatus of international organizations. It is also significant that proposals for the transfer of territories with low population density under “international control” invariably correlate with the problems of economic development of only Russian spaces, without analysis of such problems in other states with significant amount of low-populated territories. As the President of the Russian Federation noted: “after all, we have heard from officials many times that it is unfair that Siberia with its immeasurable wealth belongs to Russia. Why unfair? And to snatch Texas from Mexico is fair. And the fact that we are managing on our own land, it is unfair, it is necessary to be distributed... the fact that we protect our independence, our sovereignty and the right to exist... now the wealth of Russia should grow in the Arctic”⁷.

The obvious need now is to overcome the negative attitudes that have emerged in recent decades to abandon the protection of Russian sovereignty over the waters of the northern seas — actions that are inevitably associated with the weakening of geopolitical positions, international prestige, and tangible economic losses. Russia's recognition of the UNCLOS provisions meant a fundamental change in the legal status of the territories previously defined as “polar ownership”, and the ratification of this convention in 1997 led to the official loss of sovereignty over 1.7 million km² in the North (it is significant that the United States has not signed this Convention). An odious agreement on the Bering Sea led to the loss of more than 30 thousand km² of the exclusive economic zone and more than 74 thousand km² of the shelf. The agreement was signed, despite the direct discrepancy with the UNCLOS provisions, Art. 57. This agreement has already led to multibillion-dollar losses in the fishing, shipping and oil production. In the future, we expect losses to increase⁸. The Russian interests were also harmed in the demarcation of the Russian-Norwegian

⁶ Gorokhova A. Ekologicheskaya paranoyya: sudokhodstvo v Arktike pod ugrozoy zapreta. [Environmental paranoia: shipping in the Arctic under threat of ban] URL: https://regnum.ru/news/2404265.html?utm_referrer=https%3A%2F%2Fzen.yandex.com (Accessed: 24 June 2018). [In Russian]

⁷ Bol'shaya press-konferentsiya Vladimira Putina, 18 dekabrya 2014 goda. [Big press conference of Vladimir Putin, December 18, 2014] URL: <http://kremlin.ru/events/president/news/47250#sel=97:1:whh,97:29:kU1;91:3:hkf,91:24:vfW> (дата обращения: 24.06.2018); Bol'shaya press-konferentsiya Vladimira Putina, 14 dekabrya 2017 goda. [Big press conference of Vladimir Putin, December 14, 2017]. URL: <http://www.kremlin.ru/events/president/news/56378> (Accessed: 24 June 2018). [In Russian]

⁸ Otchot Schotnoy palaty o rezul'tatakh proverki vozdeystviya Soglasheniya mezhdru SSSR i SSHA o linii razgraniche-niya morskikh prostranstv na rybopromyslovuyu otrasl' Rossii. [Report of the Accounts Chamber on the results of the inspection of the impact of the Agreement between the USSR and the USA on the maritime delimitation line on the Russian fishing industry]. URL: http://www.ach.gov.ru/userfiles/bulletins/7-buleten_doc_files-fl-825.pdf (Accessed: 24 June 2018). [In Russian]

border in the Barents sea in 2010. Soon after the demarcation: deposits containing more than 2 billion barrels of hydrocarbons with a preliminary cost estimate of about 30 billion dollars were discovered in the area transferred to Norway⁹.

The problem of property relations in the Arctic demonstrates the modern interpretation of the principle “the right is identical to force” [12, Spinoza, p. 291]. On the one hand, it is obvious that Russia, given its present state and, above all, the context of interests, aspirations and professional level of the ruling political elite, is not able to ensure and protect sovereignty over the water area of its historical “polar possessions” [13, Josephson P.R.]. It is so mainly due to lack of political will. The tradition of freedom of navigation in the Arctic waters attributed to the “open sea” idea, which has been established in recent decades, has an effect (“No state has the right to claim subordination of any part of the open sea to its sovereignty”¹⁰), and a significant military activity of the United States, NATO countries and other states in these waters, especially the permanent presence of the US submarines here. The USA worked out the “Arctic action plan of the naval forces”, which defines the goal to “preserve the global mobility of American military and civil courts and the aircrafts over the entire area of the Arctic region”¹¹. A real attempt to protect sovereignty over the water area of polar possessions would mean violation of the order that has actually emerged over the past decades and would be fraught with not only accusations of violating international law, but also the high risk of a large-scale military conflict with the US, as well as a sharp increase in the international isolation of Russia [14, North and Arctic ...].

On the other hand, the rejection of sovereignty over 1.7 million km² of the Arctic water area — a part of the former Russian “polar possessions” not only led to enormous economic losses, but also dramatically weakened Russia's geopolitical positions, incl. the ones due to the growth of military threats in the Arctic and wide opportunities provided to foreign warships in accordance with the UNCLOS (the United States actively use these norms, however, it happens only when it is beneficial for their naval forces). As is known, the growth of the military threat demanded a significant strengthening of the Arctic group of Russian troops and a corresponding increase in the defense expenditures of the country, which causes sharp discontent and gives rise to new accusations from the “collective West” [15, Byers M., Byers C., pp. 580–591]. Preserving sovereignty over

⁹ Federal'nyy zakon ot 5 aprelya 2011 g. № 57-FZ “O ratifikatsii Dogovora mezhdru Rossiyskoy Federatsiyey i Korolevstvom Norvegiya o razgranichenii morskikh prostranstv i sotrudnichestve v Barentsevom more i Sever-nom Ledovitom okeane”. [Federal Law of April 5, 2011 No. 57-FL “On ratification of the Treaty between the Russian Federation and the Kingdom of Norway on the delimitation of maritime spaces and cooperation in the Barents Sea and the Arctic Ocean”]. URL: <http://www.garant.ru/products/ipo/prime/doc/12084483/#ixzz5llo1woj3> (Accessed: 24 June 2018). [In Russian]; Rossiya sdelala Norvegii korolevskiy podarok. [Russia made Norway a royal gift]. URL: <https://news.rambler.ru/europe/17934118-rossiya-sdelala-norvegii-korolevskiy-podarok/>(Accessed: 24 June 2018). [In Russian]; Amerikanskiy admiral nazval ucheniya u beregov Norvegii signalom dlya Rossii. [The US admiral called the teachings off the coast of Norway a signal to Russia] URL: https://ria.ru/world/20180626/1523414144.html?referrer_block=index_daynews4_1(Accessed: 24 June 2018). [In Russian].

¹⁰ UNCLOS. Art. 89. URL: http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_r.pdf (Accessed: 24 June 2018). [In Russian].

¹¹ Apanasenko V. Novaya mirovaya vojna mozhet nachat'sya v Arktike [New World War can begin in the Arctic] Nezavisimoye voyennoye obozreniye. 23.11.2012.URL: http://nvo.ng.ru/gpolit/2012-11-23/1_artic.html (Accessed: 24 June 2018)[In Russian].

the Arctic water area would deprive the current discussions on the status of the Lomonosov Ridge, while refusing sovereignty not only did not weaken the military threat in the region, but, on the contrary, sharply strengthened it (in particular, in connection with the discussion of Ridge status, the Canadian Minister of Foreign Affairs stated that “the region is strategically important for Ottawa, and therefore the state is ready to use military force to defend its interests”¹²). The essence of the problem is obviously in the real ability of our state to protect its interests in the Arctic, and the more concessions Russia will make, abandoning ownership of the Arctic objects and sovereignty over the territories, the more appetites of other states and TNCs, their claims and attempts to control the Arctic resources will grow.

Control and management are fundamental organizational activities and attributes of the property and the problem of ownership in the Arctic is related to control over exploitation. [16, Heininen L., Exner-Pirot H. & J. Plouffe, pp. 13–26; 17, Eletsky N., pp. 7–10]. It is no coincidence that the discussion of ownership and the legal status of the waters of the straits between the Arctic islands in connection with the control over the navigation along the Northern Sea Route has recently been sharply updated. Since, in many cases, the waters of the straits in all geographical areas are covered by the territorial waters of Russia, these waters should be considered as internal waters or objects that are fully under the Russian national and state jurisdiction [18, Todorov A., pp. 76–79], as well as the management and legal issues related to the passage of foreign vessels are the competence of the NSR Administration. The main function of the Administration is to “accept the applications to gain permission to sail along the Northern Sea Route, to consider these applications and to issue permits for navigation of vessels along the Northern Sea Route”¹³. These powers (rights and duties) are not recognized by the United States. But the US interpret the legal status of the straits, whose waters link the open sea, as international and prefer to use “freedom of navigation” as the right to uncontrolledly intersect Russia's inland waters of the Arctic straits by all ships, including military ones. This approach is upheld by the United States, despite its apparent inconsistency with the provisions of the UNCLOS (in many respects, in fact, and discriminatory towards Russia), which, in particular, provides for special rights of coastal states to monitor compliance with all regulations, incl. foreign environmental requirements (Art. 234).

It is significant that the main argument, used by the United States for refusing to recognize Russia's sovereignty over its internal territorial waters, is the thesis that the Northern Sea Route is the property of all mankind; at the same time, declaring concern for the interests of “all mankind”, the United States will not stop using military force (“The United States believes that the Northern Sea Route should be a transport artery open to the entire world community. This was said by the

¹² Kanada khochet voyevat' s Rossiyei za Arktiku. [Canada wants to fight with Russia over the Arctic]. URL: <https://dni.ru/polit/2014/8/26/278990.html> (Accessed: 24 June 2018) [In Russian].

¹³ FGBU “Administratsiya Sevmorputi”. Ofitsial'nyy sayt. [FSBI “Administration of the Northern Sea Route”. Official web site] URL: http://www.morflot.ru/podvedomstvennyie_organizatsii/podvedomstvennyie_organizatsii_v_moscow/fgku_administratsiya_severnogo_morskogo_puti.html (Accessed: 24 June 2018) [In Russian].

US Coast Guard commander Admiral Paul Zukunft¹⁴). Such statements are made precisely when the leadership of Russia sets the task of expanding international cooperation in the Arctic and the multiple expansion of traffic volumes, incl. international, along the Northern Sea Route. A comprehensive plan for the modernization and expansion of the country's main transport infrastructure ensures the development of the Northern Sea Route and is able to increase the cargo traffic up to 80 million tons by 2024¹⁵, i.e. by 10 times. Such an increase in traffic along the NSR that is able to reduce the length of maritime communications between East Asia and Western Europe by 40% in comparison with traditional routes, would be on one line with common human interests and would contribute to the development of the Arctic resources. Meanwhile, the United States, “declaring that the Northern Sea Route should belong to all of humanity and obviously implying itself under this humanity, [...] they recall the law of the sea and humanity only when they need to limit Russia to something ... negotiations play a crucial role, not the intentions of the parties, but their military potential”¹⁶. The Russian “Strategy for the Economic Development of the Arctic and the Northern Sea Route” can be successful only if it is provided with an extensive spectrum of legal, diplomatic and military instruments¹⁷.

Conclusion

The crisis of the modern globalism does not abolish the laws of globalization but contributes to a change of its forms. At the present stage of the development of transition to neo-globalization, regionalization of the world economy has intensified, in the form of globalization mainly. Globalization is manifested in the strengthening of the local, incl. regional, interests and peculiarities, but reflects the dominant influence of globalization. In the Arctic region, globalization is manifested in the fact that global governance there is exercised in interaction through structures, mechanisms and institutions of regional governance (in particular, in A5, A8 +, and other modes) [10, Lagutina M.L., Kharlampyeva N.K.].

Also, we cannot ignore the uncertainty of the prospects and the variability of the development scenarios for neo-globalization, as well as the fact that the formation of global property and management is a long process that will take several centuries. This time is going to be used to search for the optimal relationship between the objective and the imperatives of globalization.

¹⁴ V SSHA zayavili, chto Severnyy morskoy put' dolzhen byt' mezhdunarodnym. [In the US, they stated that the Northern Sea Route must be international] URL: http://tass.ru/mezhdunarodnaya-panorama/5116382?utm_referrer=https%3A%2F%2Fzen.yandex.com%2F%3Ffrom%3Dspecial (Accessed: 24 June 2018) [In Russian].

¹⁵ Ukaz Prezidenta RF ot 7 maya 2018 g. № 204 “O natsional'nykh tselyakh i strategicheskikh zadachakh razvitiya Rossiyskoy Federatsii na period do 2024 goda”. St. 15. [Presidential Decree May 7, 2018 No. 204 “On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024”. Art. 15.] URL: <http://www.garant.ru/products/ipo/prime/doc/71837200/#ixzz5J8xsQz53> (Accessed: 24 June 2018) [In Russian].

¹⁶ Zabelin A. Severnyy morskoy put': novoye yabloko razdora mezhdru Rossiiyey i SSHA v Arktike. [The Northern Sea Route: A New Apple of Discord between Russia and the USA in the Arctic]. URL: <https://apral.ru/2018/04/19/severnyj-morskoy-put-novoye-yabloko-razdora-mezhdru-rossiej-i-ssha-v-arktike.html> (Accessed: 24 June 2018) [In Russian].

¹⁷ Strategiya razvitiya Arkticheskoy zony Rossiyskoy Federatsii i obespecheniya natsional'noy bezopasnosti na period do 2020 goda. [Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2020]. URL: <http://government.ru/info/18360/> (Accessed: 24 June 2018) [In Russian].

Protection of nation-state interests will remain relevant. The complication of geo-economic and geopolitical problems and contradictions in the Arctic require their comprehensive scientific research [19, Matishov G.G., Dzhenyuk S.L., pp. 921–929; 20, Lazhentsev V.N., pp. 117–130; 21, Zamyatina N.Yu., Pilyasov A.N., pp. 3–30; 22, Berkman P.A. et al., pp. 596–598]. At present, we observe the crisis of the US-centered model of globalism and the transition from a unipolar to a multipolar system. New aspects of the protecting Russia's interests are identified, considering the trends of property globalization and management. Formation of multipolarity means overcoming the unipolar-hegemonic monopoly on the right to formulate, represent and protect universal goals and interests, and therefore act as the main subject of global governance and the “ultimate beneficiary” of the appropriation of world profits. In the connection to the transition to a multipolar world, the global importance and functional content of the modern sectoral division system in the Arctic water area and the special powers of coastal states is increasing. These states are designed to maximize the actions on “common human” interests in the international development of the Arctic's wealth and the efficient use of globally significant resources of the region, combined with their own interests through the development of resources in exclusive economic zones and offshore fields and observing the rules of international shipping. Considering the impossibility of ensuring full sovereignty over the Russian polar ownership with the understanding of their status before 1991, this system can be viewed as a palliative model of protecting the interests of our state in the Arctic region in the case of unconditional abandonment of the unilateral concessions, which in turn requires the all-round expansion of effective economic management in the region and the strengthening of its military defense potential due to the new hybrid Cold War. The palliative and transitional nature of the protecting Russian interests in the Arctic region is objectively determined by both the current problems of the Russian state and the contradictions of the global ownership and governance genesis.

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NORTHERN AND ARCTIC SOCIETIES

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The Arctic society under the environmental and climate change (based on survey results) *

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Abstract. Changes of the environment and climate have different local consequences in the Arctic. The article presents the research results of these impacts on traditional nature management in the perception of residents of the Nenets Autonomous District. The materials of nine focus groups and expert interviews were conducted in 2014, 2015, 2017 in the town of Naryan-Mar and two rural settlements on the island of Kolguev and Kanin Peninsula. The author reveals some reasons for the negative impact on reindeer herding: changes in the vegetation cover of tundra and populations of animals and the birds there; changes in the diet of deer; deterioration of accessibility of snow-covered forages; irrational use of deer pastures; pollution of tundra by industrial debris and waste. Hunters noted a reduction in the period of the spring hunting, deterioration in the availability of hunting resources, a decrease in the number of geese and a shift in their migration routes due to changes in the ice regime. A reduction in the number of valuable fish species is typical for fisheries. It is associated with contamination and shallowing of water bodies, an increase in water temperature and excessive fish production. Climate change positively influences the diversity and productivity of wild resources, but intensive harvesting worsens the condition of the berry. A decrease in the quality of the natural resources traditionally used by the population was observed. It increases the degree of discomfort in the remote territories of the Arctic.

Keywords: *the Arctic zone of the Russian Federation, public opinion, traditional nature management, the state of the natural environment, climate change, natural resources.*

Introduction

The transformation of nature in the northern areas is of particular relevance due to the growing influence of climate change. It creates new conditions and threats for the life and nature management of the population. Against the background of the competition between the development of hydrocarbons and traditional management, the increasing influence of climatic factors undermines the survival and adaptation of the indigenous people in the Arctic.

In the scientific literature, the influence of environmental changes on reindeer husbandry and its development is noted. Abnormally hot summer weather, the absence of stable snow cover in winter and melting of perennial frozen soils has led to a reduction in reindeer pasture areas and the availability of deer food sources, caused a sharp decrease in the physiological activity of animals and predetermined the risks of their death [1, Klokov K. B., Mikhailov V.V.; 2, Kryazhensky F.V., Maklakov K.V. et al.]. Mass death of reindeer occurs in the Yamalo-Nenets Autonomous District. The “overpopulation” of the Yamal tundra, zoo-anthropogenic depletion of pasture lands and succession of natural disasters led the reduction by 43 thousand reindeer in 2013 - 2014 i.e.: from

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278 thousand to 235 thousand reindeer [3, Perevalova E.V.]. A similar situation is on the island of Kolguyev in the Nenets Autonomous District. The number of reindeer decreased from 12 thousand in 2012 to 200 reindeer (female mostly) by the end of 2014. A ten-year moratorium was introduced for the slaughter of reindeer on the island [4, Mikhailova G.V.].

Indigenous peoples depend on local natural resources mainly. Rapid climate change has exposed great risks of economic losses and health problems for indigenous population [5, Smith K.R., Chafe Z.]. Melting of permafrost increases the risk of returning pathogens such as anthrax. In 2016, this disease was found among reindeer on Yamal¹. Changes in habitats, population density and the number of foxes and Arctic foxes due to the increase in average annual temperatures create prerequisites for the spread of rabies that is observed in the Nenets Autonomous district, where in recent years the epizootic situation on rabies is complicated [6, Romanenko T. M., Anufriev V. V., et al.].

Climate changes in the marine environment can have a decisive influence on the migration of commercial fish and, as a result, on the geography of fisheries in the Arctic and Subarctic seas. According to the experts, the positive effects will be combined with the negative effects at the same area or in other areas. The total effect for fishing industry will be negative even if we consider the expected trend of improving the fish resources in the Arctic waters [7, Kovalevsky D.V., Alekseev G.V. et al.; 8, Selin V.S., Vasiliev V.V.].

Surveys of experts and people involved in traditional economic activities and environmental management are conducted to obtain data on local climate changes and their consequences for the population. In 2006–2007 in the Chukotka Autonomous District, indigenous people were interviewed and traditional environmental knowledge about ice and weather conditions, sea hunting in the Arctic was written down within a special project of the International Polar Year [9, Bogoslovskaya L.S., Vdovin B.I. et al.]. Surveys of rural residents of Yakutia took place in 2009–2010. This data on climatic and environmental changes and their impact on the traditional occupations of the rural population was a subject for scientific analysis [10, Vinokurova L.I.]. In 2010, the Barents Sea Branch of the World Wildlife Fund organized an expedition to the Vaigach Island for biological research. At the same time, an attempt was made to study climate change and living conditions from indigenous perspective [11, Davydov A., Mikhailova G.]. In 2010–2012, in Yakutia, Kamchatka and Chukotka, monitoring of current climate changes was organized for the Center for the Promotion of the Indigenous Minorities of the North (CP IMN). The project was supported by the Development Marketplace program of the World Bank. That time, local residents observed and recorded weather phenomena and climate changes that had not been noted or measured by specialists². Sim-

¹ Sibirskaya yazva obnaruzhena u oleney na Yamale v pervyye za 75 let [Anthrax was found in deer on Yamal for the first time in 75 years]. *Interfaks v Rossii*. 25.07.2016. URL: <http://www.interfax.ru/russia/520347> (Accessed: 17 July 2018). [In Russian]

² Korennyye malochislennyye narody Severa i izmeneniya klimata: ot sbora dannykh k real'nym planam adaptatsii [Indigenous Minorities of the North and Climate Change: From Data Collection to Real Adaptation Plans]. URL: http://www.csipn.ru/component/blog_calendar/13?start=500 (Accessed: 17 July 2018). [In Russian]

ilar objectives had the project in 2012 in Alaska. Its residents acted as local environmental observers for the early detection of significant environmental changes [12, Berner J., Brubaker M.]. Interviews with reindeer herders were used in the analysis of the causes of reindeer death on the Yamal Peninsula in 2013–2014 [3, Perevalova E.V.].

Involvement of the population in the assessment, monitoring of the consequences of the environmental and climate change allows to obtain a large complex of various characteristics in their connection with the urgent needs of nature management and life. Thus, awareness of the changes in specific areas of permanent residence in the Arctic is growing.

Materials and methods of research

The secondary analysis of the field materials, ethnic and sociological surveys of the island and mainland residents of the Nenets Autonomous District was applied to study the consequences of the environmental transformation and climate change for the indigenous use of natural resources and life of the population in the Arctic. The data collection was made in the town of Naryan-Mar, the village of Nes' (the Kanin Peninsula) and the village of Bugrino (the Kolguev Island) in the Nenets Autonomous District. The collection of field ethnic and sociological material was carried out with the help of focus groups (or group interviews), as it is one of the qualitative methods of sociological research. An improbable target sample was used to form focus groups.

In 2014, three focus groups were organized on the Kolguev Island, in the village of Bugrino of the Kolguev village Council of the Nenets Autonomous district (NAO): a focus group of representatives of the education, a focus group of pensioners and a focus group of reindeer husbandry employees. In 2015, three focus groups were also held in the village of Nes' of the Kanin village Council of NAO: a focus group of pensioners, a focus group of representatives of education and medicine, and a focus group of representatives of agriculture. In the town of Naryan-Mar in 2017 focus groups of pensioners, representatives of industry and indigenous people of the North were held.

In general, the ethnic and sociological material of nine focus groups was analyzed. In addition, the materials of interviews with representatives of local authorities, heads of enterprises, organizations, medical workers, and stakeholders in environmental management in these settlements were used.

Results and their discussion

The transformation of the environment and climate change in the public opinion of the population of the Arctic are constructed around traditional types of economic activity and nature management: reindeer herding, hunting, fishing, and gathering plants.

Reindeer husbandry. Northern reindeer husbandry is the main form of traditional way of life and management of the indigenous population of the Arctic. In the Nenets Autonomous district, this type of environmental management is also a leading industry in the agricultural sector. The district has the third largest reindeer herd in Russia — about 180 thousand reindeer. At the

end of 2016, the NAO had 114 reindeer herding brigades belonging to agricultural organizations of different ownership forms: 13 agricultural production cooperatives, 9 family-tribal communities, one state unitary enterprise and one peasant farm³.

Concern of the focus groups is caused by the number of reindeers in the Nenets Autonomous District and reindeer death, associated not only with the worsening of their habitat conditions due to anthropogenic influence and industrial activity. The locals noted that the observed natural and climatic changes could have a direct or indirect impact on the reduction in the number of reindeers.

Residents of the Kolguev island paid attention to changes in *tundra vegetation* and substitution of reindeer moss vegetation: where moss was, “is now high grass growing’ and a lot of bushes. In the summer, the moss became dry: “if earlier you could walk on the carpet: the moss was soft, now it crunches under your feet like chips, and most of the tundra is dry”. The locals also noted a change in the taste of the reindeer meat: it had “become bitter”. People explained this with the bush bark: “you know that reindeer meat tastes bitter in the woods usually”, where the reindeers were “bark eating”. According to the indigenous people, the abundance of mushrooms, not typical for the island, significantly affected the change in the reindeer diet in 2012, when they began to die: “reindeer did not eat anything, they were walking on these mushrooms, because there were a lot ... Then they got swelled bellies”.

According to the observations of the focus groups participants, in winter the availability of snow-covered reindeer feed depends on the weather. After a series of thaws and frosts, a dense snow and ice cover is usually formed: “the earth is covered with several layers of ice, [...] snow falls, melts, ice is formed, and then snow and ice again. It is like a cake — three layers of ice. Reindeer may not be able to get [food] for themselves”.

In the public consciousness, degradation of the moss tundra is associated with the irrational use of reindeer pastures, reflected in the media⁴. In particular, the participants of the focus group from the representatives of education appealed to the results of scientific research known to them: “studies were made, [...] everything was trampled down, and deer have nothing to eat there”. However, it was noted that environmental conditions had been forcing nomadic economy to adjust the timing and path routes of reindeer herding. Thus, shifts in temperature and ice cover are the reason for *the urgent return of reindeer herds from winter nomads*: “... [river] Mezen does not freeze, so this year reindeer herders have returned early from the Mezen forests”.

The representatives of agriculture mainly associated the worsening of pastures with the *mechanical destruction of the tundra soil cover*: “I'm more worried about the tundra. It was all

³ V NAO prinyat novyy zakon ob olenevodstve. [A new law on reindeer breeding has been approved in the NAO]. URL: <http://adm-nao.ru/press/government/12955/> (Accessed: 17 July 2018). [In Russian]

⁴ Prichinami massovogo padezha oleney na o. Kolguyev stali izbytok pogolov'ya i nedostatok pastbishch. [The reasons for the mass deer case on about. Kolguev steel livestock abundance and lack of pasture]. URL: <http://nvinder.ru/news/2997-prichinami-massovogo-padezha-oleney-na-okolguyev-stali-izbytok-pogolovya-i-nedostaok> (Accessed: 17 July 2018). [In Russian]

traveled, walked, [...] and the soil will be restored after a very long time”, “[...] tundra suffers because of technology”. On the disturbed tundra areas, lichen is restored slowly: “after the transport, only grass grows”. Opinions are expressed about the anthropogenic pollution of the moss of the Kanin Peninsula caused by the impact of the military range: “degradation of reindeer pastures — it is ecology, [rocket] range. Reindeers should eat healthy food, and here everything is poisoned”. *Pollution of tundra with industrial waste and garbage* due to the extraction of hydrocarbons and after the deployment of military units was observed.

The ongoing and planned projects of *industrial development of the Arctic* were considered by representatives of the indigenous peoples of the North in the context of their possible impact on the traditional economy and environmental management. Thus, the construction of roads, the railway to the port of Indiga, according to focus groups, affects the interests of reindeer herders: “the worst thing is that there will be railway there. And the port is built on the calve places, calve pastures. It [the railway] will cross all [pastures]”. The development of fields in the center of the Kolguev Island raises concerns, as the road and the pipe from the field will cross the island and the routes of reindeer herding brigades: “If there will be new drillings, then the land will be reduced. And those [drillings] that stand on the edge, do not disturb us that much”.

Changes in the populations of animals and birds in the Arctic are estimated the same way. According to the focus groups participants, the increase in the number of barnacle goose and the expansion of its nesting grounds reduce the area suitable for reindeer herding on the island of Kolguev: “Goose from the shore went to the tundra. Where the goose is, the deer gets no place — it smells much there, especially in the lakes”. The increase in the number of foxes and Arctic foxes is of concern to the population due to the spread of rabies, the risk of attack of rabies-infected Arctic foxes on reindeers and herders. On the mainland, the population noted an increase in the number of polar bears, recorded cases of bears attacks on home deer.

The reindeer herding problems are related not only to Nenets people, but also to the district residents who use the products of reindeer herding. In 2017, concern of the mainland population of the district was caused by a ban on the sale of certain reindeer products (liver, kidneys) due to the increased content of harmful substances in them. Reducing the number of reindeers in remote and isolated areas, like the Kolguev Island, creates a deficit of reindeer meat and stimulates its replacement with other available one, e.g., poultry. Thus, traditional food culture or “aibordanie” — eating raw reindeer meat is threatened. The resident of the island noted that she felt a headache when she did not eat raw meat, and she would be forced to go to the mainland to do “aibordanie”.

Hunting. Hunting is a traditional way of using the wildlife in the Nenets Autonomous District. Now, amateur and sports hunting is developing. Commercial hunting is not carried out. Most district hunters hunt for home consumption. Mainly geese, ducks, and willow ptarmigans are harvested. Fur animals — foxes and Arctic foxes — are harvested individually. An important role is

played by the hunt for waterfowl in spring and autumn, when the people run out of stocks of frozen reindeer meat and the autumn slaughter of deer is not started⁵.

According to the interviewees, almost all the adult male population of the village hunts. Traditionally, they hunt migratory bird (geese) and partridge. According to the villagers, they make up more than half of their meat diet.

Arrival of geese, ways of their flight depend on climate. So, in 2015, in Nes', Chyzha, and Shoina settlements geese were not found. The geese "all went to the Islands" (incl. the Kolguev Island). Hunters said it was caused by the climate change: an early snowmelt, on the Barents Sea the snow melted and geese past the village of Nes'. A different situation was observed in 2014: the Kanin Peninsula was in the snow for a long time, so the geese returned back to the Nes' village and even nested here. *A reduction in the period of hunting was observed in spring as well as the worsening of the hunting resource availability*: if in the 1980s "flights were long, the geese flew for a long time", now "2-3 days". Previously, the geese were gathering around the village, and the hunt was near the village. Now people have to drive to hunt. A possible reason for this is the lack of snow at the end of April, "soil opens early" and the geese immediately "go" North.

According to the survey, *the number of geese is reducing, and they are the main objects of hunting, especially bean goose and white-fronted goose*. According to hunters, the so-called white-throated (white-throated goose) is reducing in the number, it has "left". The goose bean is almost absent in the spring hunting period, but not in the autumn. The decrease in the number of hunting resources is associated with *the displacement of the flying paths*: in recent years the goose is flying a side, bean goose and white-fronted goose are flying via swamps — to the East / South of the village Nes'. However, the majority of hunters believed that the population of the bean goose had declined, "the bean goose is a rare bird"; some hunters tried not to shoot the bean, "especially if the birds had a few". Respondents recorded cases of "black goose" and "gray goose" appearance. The latter one was described by the participants of the focus group: "it was gray, closer to white and smaller in size". According to respondents, there were many swans, compare to 4-5 years ago when no swans had been observed. In 2015, at the time of the survey in the village of Nes', about 300 swans were grazed near the sea. As the population of swans increased, some hunters believed hunting them was allowed.

Special attention was paid to *the increase in the population of barnacle goose* on the island of Kolguyev: "real geese has decreased in population, but barnacle goose has increased", "goose does not nest in the North nests, it was kicked out, there are few geese". A similar phenomenon is observed on the mainland. Hunters from the Nes' village remember that back in 1990-1994 they rare could see or shoot barracks, they were "surprised by such a bird". In their opinion, because of

⁵ Materialy, obosnovyayushchiye limit dobychi okhotnich'ikh resursov na territorii Nenetskogo avtonomnogo okru-ga v 2015–2016 g., Nar'yan-Mar 2015 g. [Materials justifying the limit of hunting resources in the Nenets Autonomous District in 2015–2016, Naryan-Mar 2015]. Department of Natural Resources of the Nenets Autonomous District. URL: http://dprea.adm-nao.ru/media/uploads/.../04/.../Материалы_обоснования-_2015-2016.rtf (Accessed: 17 July 2018). [In Russian]

the climate warming, the island bird goose (barnacle goose) filled all the local hunting grounds and “kicked out the goose”. Currently, the population of barnacle geese has already moved to the village of Chyzha — 150 km, and about 15–18 years ago these birds nested only on the Islands.

Environmental changes are not considered in the regulation of hunting and in establishing of its time limits. The timing of the spring hunt may not coincide with the time of geese flight. So, the hunters from the Nes’ village noted that in 2015 hunting began on May 16, and the goose had flown earlier on May 6–8. *Non-coincidence of the flying geese with the timing of spring hunting* makes it uneven or causes the violation of the hunting regulations. In order to solve this problem, in 2018, the NAO Department of Natural Resources, Ecology and Agro-Industrial Complex conducted an Internet survey on the optimal timing for the spring hunting.⁶

Fishing. The list of fishing areas of the Nenets Autonomous District currently includes 93 sites: 81 sites for commercial fishing, 7 — for indigenous people, 4 — for coastal fishing and 1 — for sports and amateur⁷.

Fish resources are in the focus for the local population. The NAO residents – respondent of the survey — were engaged in amateur and sport fishing for their own consumption. In their opinion, the number of valuable species of fish, previously consumed by the locals, is decreasing: “we now have few salmon”, “there is less grayling”. Char was not rare seven years ago: “we put twelve nets ... [...] even caught [char] with hands... now one is caught for a half of summer and that’s all”. A decline in production of saffron cod, flatfish and polar cod is visible as well: “earlier we had tons of the caught cod. A huge amount of saffron cod was there and flatfish. There was polar cod — all polar cod is gone”.

The participants of focus groups spoke about the spread of pink salmon. They called it “weed”: “there is more pink salmon. It was not found in the Pechora. Now it is”, “pink salmon — it has littered our river”. It is widely believed that the increase in the number of pink salmon negatively affects salmon: “pink salmon increased in number a lot, they say, it can replace salmon”.

According to the survey, *water pollution and shallowing of water bodies* have a negative impact on the main populations of industrial fish. *The increase in water temperature* leads to a reduction in the number of fish and causes a decrease in the fish migration area up the rivers during spawning: “the water is warmer, the usual fish leaves”, “because when the water is warmer, it [remains] in the sea”. Another negative factor is *excessive illegal fishing*. It has an impact not only on population size, production volumes, but also contributes to reducing the size: “the number of fish decreases. The fish is getting smaller”. According to the focus group of indigenous peoples of the North, the construction of a port in the village of Indiga and dredging will lead to *lower quality of water* and have negative consequences for fish and marine animal populations.

⁶ Golosovaniye po srokam vesenney okhoty zavershitsya v nachale aprelya. [Voting on the timing of spring hunting will end in early April] Government of the Nenets Autonomous District. 12.03.2018. URL: <http://adm-nao.ru/press/government/17873/> (Accessed: 19 July 2018). [In Russian]

⁷ Rybakam NAO dobavili uchastkov. [They added areas to the fishermen in NAO]. URL: <http://fishnews.ru/news/32264> (Accessed: 17 July 2018). [In Russian]

Abnormal weather conditions harm traditional fishing. Residents of the Nes' village noted that approximately in 2012 a solid ice cover was absent on the water surface — “the river had no ice in the time of traditional winter fishing”. Periods of fishing decreased: earlier, in the Nes' village “herring was caught by everyone and it was enough. Now it is necessary to catch a particular period”.

Unusual for the modern time is the case of catching of an almost three-meter polar shark with fishing nets near the village of Bugrino. It was in the media where it was also noted that in the 20th century Russian, Norwegian and Icelandic fishermen had been actively fishing for sharks.⁸ Locals had not seen sharks for many years and connected this case with the environmental and climate change.

According to the local population, *the appearance and taste of fish have changed*: “tasteless, I think, it has become”, “it has lost its taste due to oil spills”; the fish is “ugly”, “bald”, “and salmon can be bald too”. On the island of Kolguev, barrels of fuel pollute the water and have an anthropogenic impact on fish. A population of the village of Bugrino recorded the following facts: “the fish is not like it has been”, flatfish “gets sick”, “smells kerosene [diesel] a little”.

Wild plants gathering. The population of the district considers the gathering berries and mushrooms an additional income. It ensures their food security. The NAO authorities support several business projects for the processing of mushrooms and various berries: cloudberries, cranberries, blueberries, blueberries and red currants⁹.

Changes in the temperature regime and the increase of the vegetation period have a positive impact on the *diversity and productivity of wild plants*. The island of Kolguev is rich with mushrooms, and the local population is actively collecting them. The productivity of cloudberries on the island has become quite high: “earlier, cloudberries were not there every year”, and it was collected ones in two years.

However, the opinion of the urban population of the district is not so simple; they believe that the change in the amount of berry (cloudberry) depends on the places of gathering: somewhere more, somewhere less. An increase in the number of berry pickers, intensive *gathering of berries for sale* also contribute to the reduction of berries. The participants in the focus groups noted the reduction of berries as well because “all berries were exchanged for money”.

Reindeer breeding has a negative impact on the ability to collect wild plants. It happens due to the change in the length of the hauls and stays of reindeer herds on the Kanin peninsula. The available wild growing resources are not suitable for gathering: “everything is trampled by reindeer, [...] the reindeer breeders began to drive the herds to the villages for a long time”, “mushrooms,

⁸ Vblizi ostrova Kolguyev v Nenetskom okruge pojavilis' akuly (Arkhangel'skaya oblast') [Sharks appeared near the island Kolguev in the Nenets district (the Arkhangelsk Oblast)]. Novosti 29, 2012. URL: http://www.news29.ru/novosti/proishestviya/Vblizi_ostrova_Kolguyev_v_Nenetskom_okruge_pojavilis_akuly_Arhangelskaja_oblast_/20588/print (Accessed: 17 July 2018). [In Russian]

⁹ Pri okruzhnoy podderzhke v NAO realizuyutsya dva novykh biznes-proyekta po pererabotke dikorosov. [In the NAO the district supported two new business projects for processing wild plants] URL: <http://adm-nao.ru/press/government/16383/> (Accessed: 17 July 2018). [In Russian]

cranberries, cloudberries feed us. And if they are all trampled, then the pensioners have no place to pick up mushrooms and berries. There is no place to go, there are no clean places”.

An anthropogenic impact on the local berries was also noted: “now the cranberries are turning black”, “two year ago rain fell down and all the [cranberries] turned black”. According to the residents of the village of Nes’, atypically large cloudberries are growing in the areas contaminated by radiation. Locals do not collect these berries.

Conclusion

According to the inhabitants of the Arctic territories, all types of traditional economic activities and environmental management (reindeer herding, hunting, fishing, and gathering wild plants) are affected by both climate change and anthropogenic impact. Concerns among the population are caused by the lower availability and quality of traditionally used natural resources, as well as related events. The problems of reindeer herding are the most widely represented. The perception of the death rates of home reindeer reflects changes in temperature and ice cover, vegetation of tundra and populations of animals, birds, as well as deficiencies in the organization of deer grazing, negative impacts of economic and other activities. The positive effects of climate change are noted for the gathering of wild plants. It is manifested in an increase in the diversity and productivity of wild-growing resources. In general, weather anomalies, climate changes make significant adjustments in the timing and duration of traditional economic activities and environmental management; threaten the food security of people and increase the degree of discomfort and extremity of their life in the remote Arctic areas.

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CONSERVATION OF THE CULTURAL AND NATURAL ENVIRONMENT OF THE ARCTIC

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Protected areas network in the Murmansk Region: yesterday, today, and tomorrow*

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Abstract. The article represents a retrospective of nature conservation in the Murmansk Region. It is devoted to the period since the first State Nature Reserves to the present day. Today, the network of Protected Areas (PA) in the Murmansk Region consists of three nature state Reserves, one National Park, two natural parks, 12 protected areas “Zakaznik”, 55 nature monuments and the protected area of the Polar-Alpine Botanical Garden-Institute. The total area of the PA is 1,947,799.4 hectares or 13.4% of the Murmansk Region. An effectiveness of the PA was assessed due to the correspondence of the protection regimes and the threats. The authors concluded that effective environmental protection could be realized only in small part of PA, mainly in nature state reserves and national park, whose total area is only 4.2% of the Murmansk Region. At the present level of efficiency, even if it will be possible to achieve a share of Pas equal to 16.4% of the region’s area, it is hardly possible to guarantee the proper level of biodiversity conservation and the stability of the ecosystem of the region.

Keywords: *protected areas, rare species, nature conservation, the Murmansk Region.*

Introduction

The Murmansk Oblast (Region) is one of the most industrially developed areas of the Arctic zone of Russia. On the one hand, this makes our area a leader in terms of social and economic development, but on the other — it has a negative impact on natural systems. The main method of nature conservation is the creation of specially protected natural territories — SPNTs [1, Saura S. et al.]. In accordance with the Federal Law “On Specially Protected Natural Territories”¹, SPNTs are “plots of land, water surface and air space above them, where natural complexes and objects are located that have a special environmental, scientific, cultural, aesthetic, recreational and health value, which are removed by decisions of public authorities in whole or in part from economic use

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¹ Federal'nyy zakon ot 14.03.1995 № 33-FZ “Ob osobo okhranyayemykh prirodnykh territoriyakh” [Federal Law of March 14, 1995 No. 33-FZ “On Specially Protected Natural Territories”]. [In Russian]

and which special protection". According to the Russian legislation, the protected areas regime is a legal instrument to ban or restrict economic activity, and it is established not only for environmental purposes, but also for the protection of natural, historical and cultural heritage. Recently, the problem of SPNTs effectiveness evaluation has become the most acute [2, Joppa L.N., Pfaff A.; 3, Stishov M.S.; 4, Geldmann J. et al.; 5, Coetzee B.W.T. et al.]. The Murmansk Oblast has a long and complex history of the territorial nature protection. Earlier [6, Kobayakov K.N., Smirnov D.Yu.] an attempt was made to analyze the development of the protected area network for the period 1930–2000. The purpose of this article is to provide a brief historical overview and present the current situation of the local network of protected areas; to propose an approach to assessing its effectiveness and to outline the main prospects for development.

History of territorial nature protection in the Murmansk region

The history of territorial nature protection in the Murmansk region began with the industrial development of the region and the construction of the Murmansk railway. In the formation of the regional network of protected areas can be identified the following stages:

- **1910s — 1930s.** Before the October revolution of 1917, nature protection was not systemic and focused on the observance of private property rights. For a long time, the territory of the modern Murmansk Oblast remained a "bearish corner" of the Russian Empire. The situation changed after the construction of the Murmansk railway in 1916 and the industrial development of the area. October 15, 1917, on the Environmental Commission of the Russian Geographical Society, an outstanding scientist, a geographer and a public figure V.P. Semyonov-Tyan-Shansky presented a report "On the types of areas where it is necessary to establish nature reserves like American national parks". He proposed 46 territories for protection. Khibiny mountains were the first in his list [7, Semyonov-Tyan-Shansky V. P.]. In 1920s, the use of Khibiny for nature tourism [8, Eichfeld I. G.] was discussed. At the same time, the idea of creating a Lapland reserve appeared [9, 10, Kreps I.D.]. In Finland, the first reserves and national parks were created in the North-Eastern territories. Under the Moscow Treaty (1940) and the Paris Treaty (1948) they became a part of the Murmansk Oblast [11, Häyrén, 12, Linkola, 13].
- **1930s — 1950s** – the first reserves. The Lapland Reserve was established in 1930 to preserve the wild reindeer and untouched nature areas. Kandalaksha Hunting Reserve was established in 1932 as a seasonal reserve [14, Karpovich V.N., p. 9]. In 1939, it received the status of the state nature reserve. Its main purpose is to protect the habitats of sea, waterfowls, first of all, eiders. At the same time, in 1931, the Polar-Alpine Botanical garden was organized in the Khibiny mountains. In 1938, in Finland (now it is the territory of the Murmansk Oblast, but it was a part of Finland due the Treaty of Tartu, 1920), three nature reserves with strict protection measures were established: "Kutsa" in the South-West of the Murmansk Oblast now; "Pääskyspahta", North of the "Pasvik" reserve, "Pummanki" on the Sredniy Peninsula and the national Park "Heinäsaaret" on the Ainovi Islands. However, these protected areas did not exist long: after the Winter war and the WW II, these territories became a part of the Soviet Union. In 1938, a reserve "Sem' Ostrovov" ("Seven Islands"). In 1947, Ainovi Islands and a part of the Semistrovskiy archipelago were a part of this reserve. In 1951, the reserve "Seven Islands" and the Ainovi Islands were included in the Kandalaksha Reserve [15]. On August 29, 1951, the Lapland Reserve, like the other 87 reserves of the country, was closed by the decree of

the USSR Council of Ministers, and its territory was transferred to the Monchegorsk forestry for economic exploitation [16, Semenov-Tyan-Shansky O. I.]. This ill-considered decision caused a great damage to the nature of both the reserve and the Oblast.

- **1957–1990s.** In 1957, after six years of persistent struggle of the scientific and environmental community, the RSFSR Council of Ministers approved the establishment of the Lapland Reserve, and in 1958, it also approved the boundaries of the Reserve. They were almost the same as before. But in 1961, the Lapland Reserve was merged with the Kandalaksha Reserve, declared its branch. In 1965, it was again restored as an independent institution. In the 1970s, expanding the territory of the reserve in North-West for the purpose of wild reindeer pastures and migration paths preservation became an issue. It was planned to include a part of the Sebaceous tundra and the surrounding forest areas near the upper reaches of the rivers Vuva, Rogovaya and Liva with lichen forests, situated between them, and a part of the watershed between the Barents Sea and the White Sea. The Murmansk Oblast Executive Committee and Glavokhota of the RSFSR contributed to the decision of the RSFSR Council of Ministers on September 13, 1983 to a double increase the territory of the Reserve (by 129 577 ha). In 1985, UNESCO included the biosphere reserve “Lapland Reserve” in the worldwide network [16, Semenov-Tian-Shansky O.I.]. Some more reserves and nature protection areas appeared that time. Hunting and fishing reserves appear to maintain and restore commercial species. Girvasskiy reserve was established for the reproduction of elk, Byvskiy and Pirengskiy — wild reindeer, Varzygskiy by the river Note and Ponoiskiy fishery reserve — salmon and European pearl. At the same time, the regime of hunting reserves did not provide the prohibition of the main destructive economic activities. Scientists from the Kola branch of the USSR Academy of Sciences, members of the Murmansk branch of the all-Union Society for Nature Protection and the all-Union Geographical Society completed corresponding studies and grounded geological, natural, historical, hydrological and botanical protection objects and forest monuments of nature [17, Kryuchkov V.V., etc.]. At this time, geological and geophysical polygons were given the status of natural monuments of regional importance. It was a feature of the SPNT network of the Murmansk Oblast.
- **1990s.** In the development plans of the SPNT network, the idea of integrated nature protection begins to dominate [6, Kobayakov K.N., Smirnov D.Yu.]. This was largely due to the activities of expeditions of the Nature Protection Squads. They effectively transferred the experience of complex reserves in Central Russia to the Murmansk Oblast. The most important results of this period: in 1993, the creation the “Pasvik” reserve “on the border of Russia, Finland and Norway and the establishment of complex reserves “Kolvitz-Kiy” and “Kutsa”. In mid-90s – 2000s, the number of SPNTs reduced (because of the expiration of the hunting reserves docs, the destruction of nature monuments, etc.). The efforts of environmental organizations, mainly the Kola Center for Wildlife Protection, and the KSC RAS research institutes, it has become possible to identify and study valuable intact natural plant communities and habitats of rare and endangered species of flora and fauna. The obtained data formed the basis of proposals for the organization of several protected areas of different ranks. In 1998–2000, the scientists of the KSC RAS Institute of Industrial Ecology of the North and specialists from the other scientific and educational institutions and environmental organizations prepared ecological and economic foundations of four protected areas, incl. the national parks “Kutsa” and

“Khibiny”². Several identified valuable natural areas had been proposed for re-reservation and subsequent protection. In parallel with the design and study of specific SPNTs, a theoretical rationale and plans for the development of the SPNT network in the Murmansk Oblast were created.

- **2001–2010.** After a long break, several new protected areas had been created: the Simbozersky reserve and three major nature monuments in the eastern part of the region: Dvorovoi Bird Bazaars, Ivanovskaya Guba Bird Market and Viddupakhk Mountain Area. At the same time, the justification of a promising network of protected areas was going on. That time, environmental organizations of the Murmansk Oblast and specialists from the Arkhangelsk, Vologda and Leningrad Oblasts, the Republic of Karelia and St. Petersburg, worked on the large-scale project “GEP-Analysis in North-West Russia”, aimed at assessing the local Pas representativeness [18]. Regulation of the territorial nature protection of the oblast was improved as well. The provision on the Red Book of the Murmansk Oblast [19] secured a mechanism for the protection of rare species — issuing orders for the removal of habitats of rare species from economic activity (unfortunately, for the ten-year period that passed between the reprints of the Red Book of the Murmansk Oblast, this convenient tool it has not been used: no prescriptions were issued to business entities). In 2007, the regional law “On Specially Protected Natural Territories” was approved³.
- **Since 2011.** In 2011, the results of the “GEP - Analysis in North-West Russia” project was the Concept of Functioning and Development of the specially protected natural territories network of the Murmansk region until 2018 and for the future until 2038”⁴. An integral part of the current Concept was The Scheme of Development and Distribution of Protected Areas of the Murmansk Oblast. It identifies the main subject to the construction and reorganization of protected areas, the grounds for their creation and reorganization and the timing for these actions. Most of the protected areas were included in the main regulatory documents that determine the territorial development of the oblast — “Forest plan of the Murmansk Oblast”⁵ and the “Scheme for territorial planning of the Murmansk Oblast”⁶. In accordance with the mentioned documents, in 2011 the complex regional reserve “Lapland forest” was organized. In 2014, the Murmansk Oblast got the first natural park “Peninsula Ribachiy and Sredniy” and regional reserve “Kaita”, four natural monument of regional significance: “Haym-Ruchei”, “Kluchevoe boloto of the Turiy Peninsula”, “Lichens of old-growth forests of the White Sea Coast” and “Iringora”. Two more large protected areas appeared in the region: the national park “Khibiny”

² Ekologo-ekonomicheskiye obosnovaniya novykh osobo okhranyayemykh prirodnykh territoriy v Murmanskoy oblasti [Ecological and economic studies of new specially protected natural areas in the Murmansk Oblast]. URL: <http://www.biodiversity.ru/kola/index.html> (Accessed: 06 July 2018). [In Russian]

³ Zakon Murmanskoy oblasti ot 10.07.2007 № 871-01-ZMO “Ob osobo okhranyayemykh prirodnykh territoriyakh v Murmanskoy oblasti” [Law of the Murmansk Oblast dated July 10, 2007 No. 871-01-ZMO “On specially protected natural territories in the Murmansk Oblast”]. [In Russian]

⁴ Postanovleniye Pravitel'stva Murmanskoy oblasti ot 24.03.2011 ot 128-PP “Ob utverzhdenii Kontseptsii funktsionirovaniya i razvitiya seti osobo okhranyayemykh prirodnykh territoriy Murmanskoy oblasti do 2018 goda i na perspektivu do 2038 goda” [Resolution of the Government of the Murmansk Oblast of March 24, 2011 No. 128-PP “On approval of the Concept of operation and development of the network of specially protected natural territories of the Murmansk Oblast until 2018 and for the future until 2038”]. [In Russian]

⁵ Postanovleniye Gubernatora Murmanskoy oblasti ot 31.10.2011 № 121-PG “Ob utverzhdenii Lesnogo plana Murmanskoy oblasti” [Resolution of the Governor of the Murmansk Oblast of October 31, 2011 No. 121-PG “On approval of the Forest Plan of the Murmansk region”]. [In Russian]

⁶ Postanovleniye Pravitel'stva Murmanskoy oblasti ot 19.12.2011 № 645-PP “Ob utverzhdenii skhemy territorial'nogo planirovaniya Murmanskoy oblasti” [Resolution of the Government of the Murmansk Oblast of December 19, 2011 No. 645-PP “On approval of the scheme of territorial planning of the Murmansk Oblast”]. [In Russian]

and the natural Park “Korablekk” (in the Concept, this territory was specified as a protected area of the “Pasvik” reserve). From a formal point of view, it can be considered that the Concept is very successful. However, some SPNTs were created before the schedule. This has led to the fact that the territories with more valuable and vulnerable natural objects and complexes did not receive timely protection: reserves “Poriy Lest”, “Jonh-Nugoaiv”, nature monuments “Guba Voronya”, “Kandalakshskiy Bereg”, “Pati-ozerie”, “Redkiye lishayniki i pechonochniki v verkhov'yakh reki Tsaga”, and “Swamps at Lake Alla-Akayarvi”. According to the Concept, these areas had to be arranged before 2018.

Since 2016, the regional Ministry of Natural Resources and Ecology has been focusing on the work to assess the effectiveness of the SPNTs network. The main purpose is to clarify their boundaries, to assess the safety and to recommend, if necessary, a change in the protection regime. In 2016, natural monuments of the Pechenga district were surveyed: “Kedr Sibirskiy”, “Vodopad na reke Shuoniyok”, “Biograppa yeley (Spruce Tree Biogroup at the border of the area)” and “Geologo-geofizicheskiy poligon “Shuoni-Kuets”. The last two sites were recommended to be deprived of the status of protected areas due to the loss of the environmental value. In 2017, a survey of nature monuments from the Apatitsky, Kirovsky and Monchegorsky districts was conducted: “Ushchel'ye Aykuayvenchorr”, “Kriptogrammoye ushchel'ye”, “Evtrofnoye boloto yuzhnogo Prihibin'ya”, “Yokostrovskoye kintishche”, “Yuksporlakk”, “Kedry i listvennitsy vozle stantsii Khibiny”, “Bazal'toidnyye lavy u Rizh-Guby”, and “Lednikovyy valun”. The last monument was recommended for liquidation due to the loss of the object of protection.

At the beginning of 2018, at the request of the IPPES staff of the KSC RAS and PABSI KSC RAS, the Ministry of Natural Resources of the Murmansk Oblast issued an order restricting economic activities in the Louvenskiy bog to protect rare species of vascular plants growing there. The natural park “Peninsula Rybachiyy and Sredniy” and the “Kolvitskiy” reserve were reorganized. In the summer 2018, research was completed in the Lovozero area.

The current situation of the SPNT network

Today the SPNT network in the Murmansk Oblast includes (Fig. 1):

- Three reserves: “Kandalaksha” (70,500 ha, incl. water area; the territory — 20,450 ha), “Lapland” (278,435 ha with a protected area of 27,998 ha) and “Pasvik” (14,687 ha);
- Khibiny National Park (84,804 ha);
- two natural parks — “Rybachiyy and Sredniy Peninsulas” (83,062.5 ha) and “Korablekk” (8 341 ha);
- 12 reserves: 5 — complex, 3 — biological, 2 — biological (fisheries) and 1 — zoological; a total area — 1,426,880 ha; 3 reserves have a federal status;
- 55 nature monuments with a total area of 16,967.3 ha; 4 nature monuments have federal status and one is municipal;
- protected area of the Polar-Alpine Botanical Garden-Institute of the KSC of the Russian Academy of Sciences, with an area of 1,257 ha.

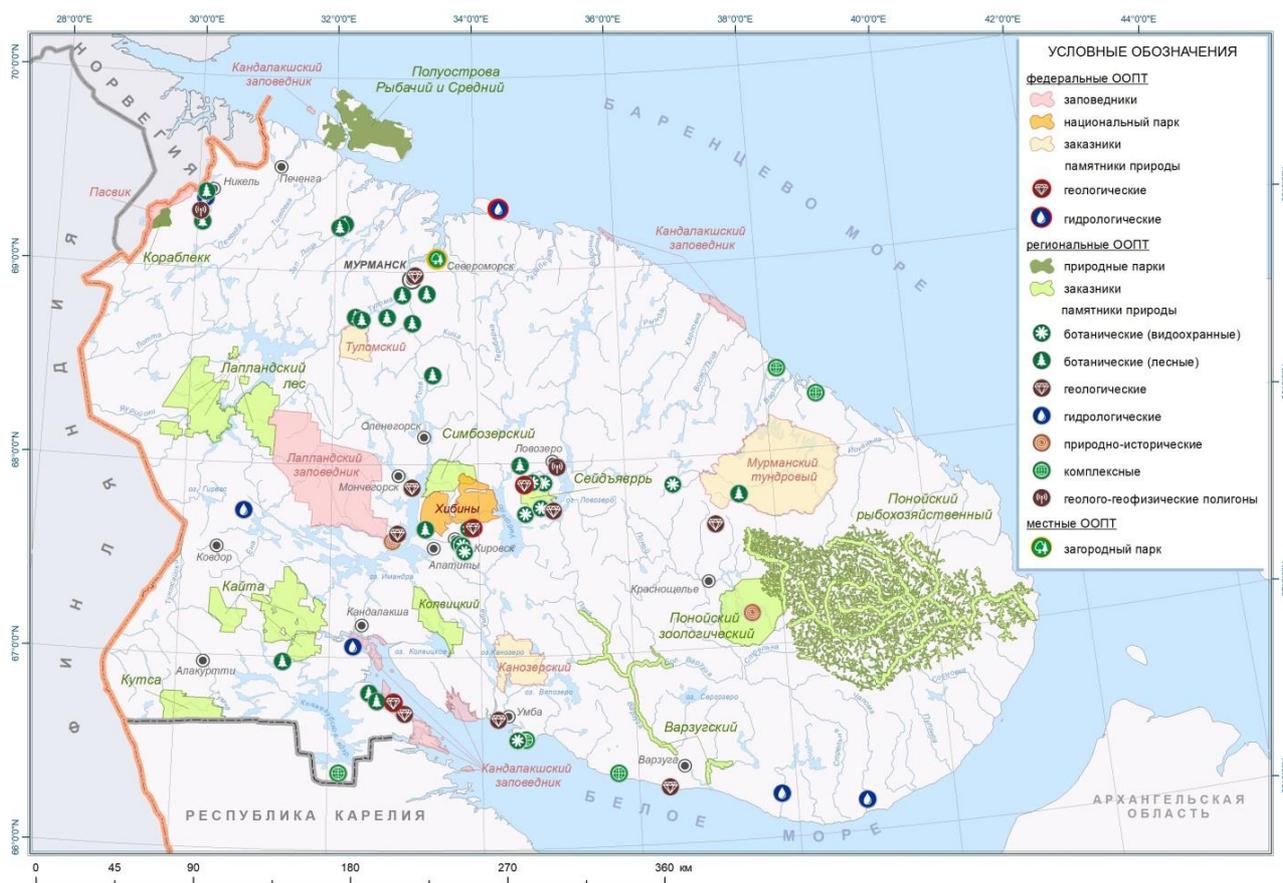


Fig. 1. Current SPNTs of the Murmansk Oblast.

The total area of SPNTs in the Murmansk Oblast is 1,947,799.4 ha or 13.4% of the its territory⁷. At first glance, the territory of protected areas in the Murmansk Oblast is quite large. However, is it sufficient to fulfill the tasks of the SPNT system: preservation of biological diversity and natural complexes? Determining the exact proportion of a territory or an area of any ecosystem that needs to be protected to prevent its further degradation or loss of natural biodiversity, is a task which, due to the enormous complexity of natural systems, is currently in not solved.

To determine the minimum share that must be protected, one can use the assessment adopted at the 10th Conference of the parties to the UN Convention on Biodiversity⁸. The recommended share of SPNTs was set at 17% of the land area. However, Resolution of the Government of the Russian Federation No. 326 of April 15, 2014 "On Approval of the State Program of the Russian Federation "Environmental Protection" for 2012–2020" adopted a new version of the Russian Federation's "Environmental Protection Program", in which the share of SPNTs remained the same, as in the previous edition of this program — 13.5% by 2020. At the same time, the President of the

⁷ When calculating, it was considered that several SPNTs of the Murmansk Oblast have partial or complete overlapping of territories. i.e. the territories of the "Ponoyskiy ornitologicheskii" and "Ponoyskiy rybokhozyaystvennyi" reserves (7,202.3 ha), the "Simbozerskiy" reserve and the "Khibiny" national park (3,778.7 ha). Three natural monuments located within the borders of other SPNTs: "Mozhzhel'niki vozvyshennosti Maga-zin-Musyur" (3,000 ha) fall into the "Murmanskiy tundrovyy zakaznik"; "Naskal'nyye izobrazheniya u poselka Chal'mny-Varre" (1 ha) – into "Ponoyskiy ornitologicheskii Reserve" and "Kedry i listvennitsy vozle stantsii Khibiny" (2 ha) – "Khibiny" national park.

⁸ Tenth meeting of the Conference of the Parties to the Convention on Biological Diversity 18. 29 October 2010. Nagoya, Aichi Prefecture, Japan. URL: <https://www.cbd.int/meetings/COP-10> (Accessed: 06 July 2018).

Russian Federation approved the “Fundamentals of state policy in the field of environmental development of the Russian Federation for the period until 2030”. Par. 16, subparagraph a) establishes the need to “strengthen the protection and development of a system of specially protected natural territories of federal, regional and local importance in strict accordance with their intended purpose”. Thus, it is unreasonable to consider in the total area those SPNTs whose mode does not correspond to their intended purpose. The same document, par. 16, subparagraph c) establishes the need for “forming and ensuring the sustainable functioning of systems of protected natural territories of different levels and categories to preserve biological and landscape diversity”. Thus, the criterion of the SPNT network effectiveness is the preservation of biological and landscape diversity.

To determine the effectiveness of individual SPNTs in the region, we used a method based on the analysis of the compliance of prohibitions on various types of economic activity on SPNTs and the threats existing for these territories [18, Preservation ...]. Federal Law “On Specially Protected Natural Territories”⁹ defines common features of protection regimes. However, they are specific enough only for nature reserves, while for other categories of SPNTs only very general recommendations are given, and therefore the mode of these SPNTs is determined mainly by the Regulations / Passports for each SPNT. However, they can vary greatly even within the same category of protected areas. Thus, for some reserves, any economic activity may be permitted, except for hunting ungulates in some seasons. For a part of the protected areas (first of all, it concerns nature monuments), protection regimes are not defined at all.

Is it possible to identify how each SPNT can effectively preserve natural complexes? According to the analysis of existing SPNTs’ regimes in accordance with the Regulations (Passport) of each SPNT, three main types of the most “nature-transforming” regimes were identified. In most cases, these regimes lead to significant damage or loss of natural complexes and the territory lost its value:

- logging (P);
- exploration, mining, peat and sapropel (G);
- construction outside settlements, including the construction of buildings, roads, pipelines, power lines and other linear structures and communications (except for the construction of SPNT infrastructure) (S).

For every SPNT (functional zone). All regimes were categorized for the purpose of the analysis:

- Conservation protection regime. All types of economic use of the territory are prohibited. In addition, restrictions on visits are introduced. Only the reserves and protected areas of the national park have such a regime in the Murmansk Oblast.
- The SNPT protection regime with a ban on any logging, geological exploration, pre-mining for hydrocarbons, peat and sapropel, any constructions outside settlements, incl.

⁹ Ob osobo okhranyayemykh prirodnykh territoriyakh (s izmeneniyami na 3 avgusta 2018 goda) (redaktsiya, deystvuyushchaya s 1 sentyabrya 2018 goda). [On specially protected natural territories (as amended on August 3, 2018) (revised from September 1, 2018)] URL: <http://docs.cntd.ru/document/9010833> (Accessed: 06 July 2018).

the construction of buildings, roads, pipelines, power lines and other linear structures and utilities (except for – SPNT’s infrastructure facilities); in other words, the prohibitions of P + G + S.

- The SNPT protection regime, incl. one or two bans of the following three: 1) a ban on any logging, 2) a ban on exploration, mining, peat and sapropel, 3) a ban on constructions outside settlements, incl. construction of buildings, roads, pipelines, power lines and other linear structures and communications (except for the construction of SPNT’s infrastructure facilities); in other words, one or two prohibitions from P, G, S.
- The SNPT protection regime does not prohibit any activity, discussed above.

It is obvious that the goals of preserving natural complexes in their original state and preserving biodiversity (the main objectives for SPNT or PA systems) fully correspond to SPNT s only in the 1st and the 2nd groups of protection regimes. Protected areas with the 4th group of protection regime obviously cannot be considered as a complete element of the SPNT system. Although regimes have restrictions on certain types of economic activities (e.g., hunting or fishing, etc.), they are constantly and potentially under threat of losing the objects of protection caused by the development of mineral resources or deforestation. The 3rd group of protection regimes occupies an intermediate position: one or two activities listed above are prohibited for this group, but the threat of losing the environmental value caused by not prohibited activities still remains.

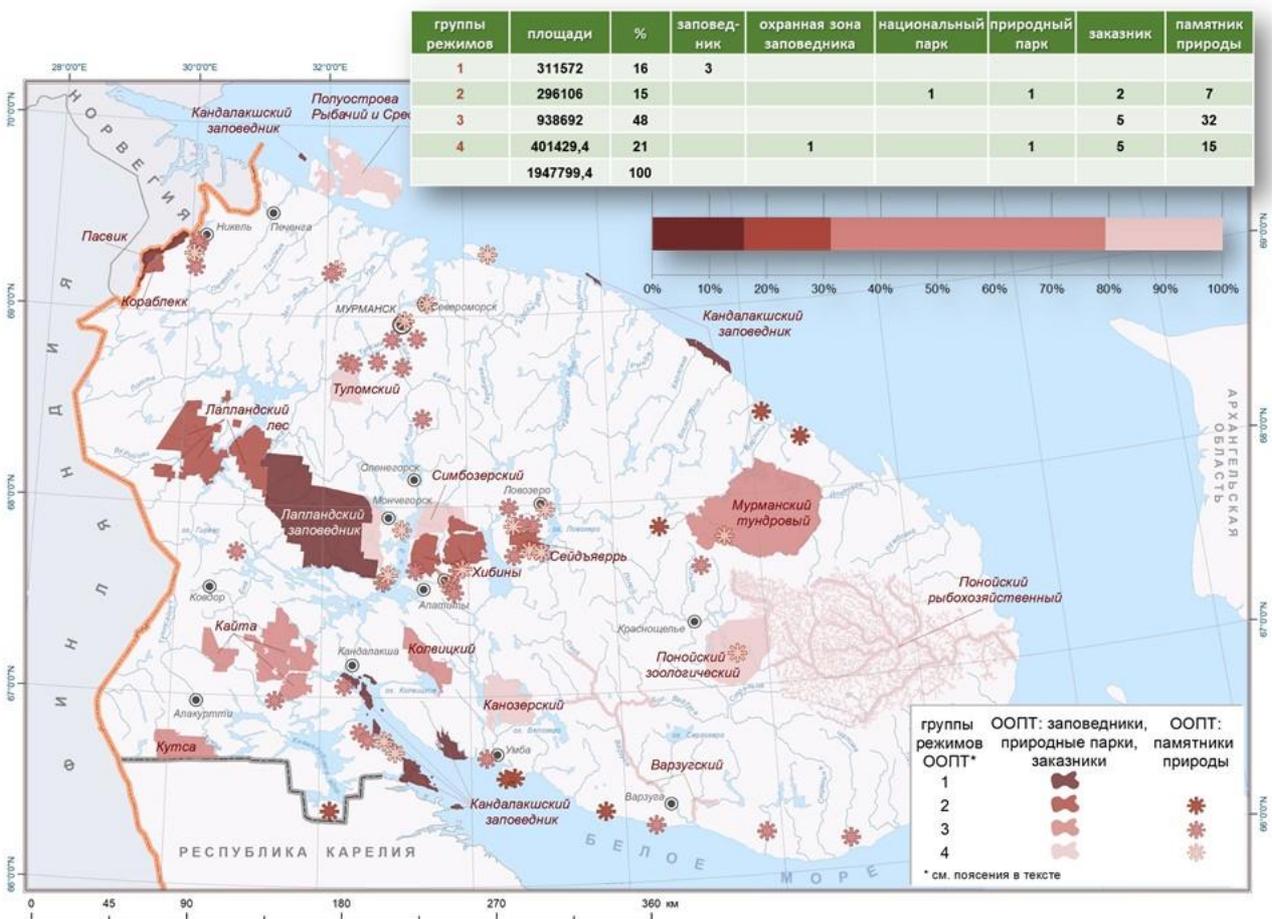


Fig. 2. SPNTs of the Murmansk Oblast related to different groups of protection regimes.

The analysis of the SPNT regimes of the Murmansk Oblast shows that preserving valuable natural objects and complexes is carried out only on one-third of the SPNTs (Fig. 2): in three re-

serves, a national park, one of two natural parks in the oblast, two reserves and seven natural monuments. 21% of the protected areas have no bans on medium-transforming types of economic activity. Especially crucial is the fact that, in addition to the nature monuments and protected zones of the reserves, this group includes five reserves (two of them are of federal significance) and a natural park. Almost half of all SPNTs in the Murmansk Oblast belong to the 3rd group of protection regimes i.e., these SPNTs remain under threat of environment-transforming activities, and therefore, environmental protection criteria are not met. The protected areas of this group are most of the natural monuments and, importantly, the regional network of protected areas - most of the reserves of regional subordination. Thus, the area of the protected territories of the Murmansk Oblast, which, according to their documentation, can effectively fulfil the assigned environmental objectives, is only 607,678 ha, or 4.2% of the Oblast's area. 396 376 ha or 65% of these "effective SPNTs" are reserves and a national park, i.e. the territory of federal subordination.

Prospects for the development of the SPNT network in the Murmansk Oblast

The prospects for the development of SPNTs of the Murmansk Oblast are determined by two factors.

The first one is the presence of relevant scientifically based plans for the development of the SPNT network. In 2011, the Concept of Functioning and Development of the SPNT network of the Murmansk Oblast until 2018 and for the period until 2038 was adopted. The document implies a 16.4% increase in the area of protected areas in the Murmansk Oblast, which is only less than 17% recommended for land areas by the 10th Conference of the Parties to the UN Convention on Biodiversity. The Concept has been in effect for 7 years and it requires only a slight adjustment based on the updated data on the distribution of valuable natural objects and complexes and the threats they may face. At the same time, since in the Murmansk Oblast has an active assessment of the effectiveness (assessment of the protected objects, proposals for optimizing boundaries and modes of protection) for not only existing but also for prospective SPNTs protected areas. Making necessary adjustments won't cause any difficulties. We hope that in two decades, an SPNT network will appear in the Oblast and it will fulfil the task of preserving the main natural complexes and biodiversity of the Oblast.

However, an analysis of SPNTs distribution by groups of protection regimes, relevant for the SPNTs created after the adoption of the Concept, shows that effective (the 2nd group of protection regimes) and ineffective (the 3rd and the 4th groups of protection regimes) SPNTs were created in approximately equal proportions (54% and 46% respectively). This speaks of the second factor influencing the development of the SPNT network of the Murmansk Oblast and of the country: the lack of legal regulation and proper management of the SPNTs network. Design, creation and functioning of each SPNT are considered as a separate project. Accordingly, if we have a conflict between specialists interested in preserving the intact natural communities and biodiversity and those who see the SPNT creation as an obstacle to the economic activity, then its outcome

depends only on the lobbying capabilities of the parties and on the subjective position of decision-makers. If such a confrontation is resolved in the way it has been in recent years in the Murmansk Oblast, then to ensure the biodiversity and the sustainability of the ecosystems, it will be necessary to include more than 30% of the Oblast's area in the SPNTs, then 17% of the territory recommended by the 10th Conference of the Parties to the UN Convention on Biodiversity will be provided with sufficient protection. It is clear that such an indicator is unattainable in the foreseeable future.

Conclusion

Thus, six periods can be distinguished in the development of the SPNT network in the Murmansk Oblast. They correspond to the stages of industrial development of the Oblast and the development of the state system of nature protection. Now, the SPNTs network of the Murmansk Oblast includes three reserves, one national park, two natural parks, 12 reserves, 55 nature monuments and the territory of the KSC RAS Polar-Alpine Botanical Garden-Institute named after N. A. Avrorin. The total area of protected areas is 1,947,799.4 ha or 13.4% of the Oblast. Evaluating the effectiveness of the SPNTs on the basis of the compliance of the protection regimes with the threats showed that nature reserves and the national park, one natural park of the Oblast, two nature reserves and seven natural monuments are able to fulfil the nature protected standards. The total of these territories makes up only 4.2% of the Oblast. It is important for the development of the SPNT network to have scientifically based plans for its development, especially, the Concept of Functioning and Development of the SPNT network of the Murmansk region until 2018 and for 2038. The application of the Concept means the increase in the share of protected areas by 2038. It will be 16.4% of the total area of the Oblast. Summarizing the assessment of the effectiveness and prospects for the development of the SPNT network of the Murmansk region, it can be argued that even with the achievement of this percentage and with the modern legal regulation of the SPNT creation, it is hardly possible to ensure the preservation of biodiversity and the sustainability of ecosystems in the Oblast.

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Plastic pollution tendencies of the Barents Sea and adjacent waters under the climate change*

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Abstract. The article represents the analysis of the plastic pollution of water areas and coasts of the Barents Sea and adjacent waters based on foreign and Russian studies. The authors consider the influence of various factors, including climate change in the Arctic. The threat to various types of marine activities and the marine ecosystem from plastic pollution is evaluated. The emphasis is on the existing and potential damage to industrial fisheries in the Barents Sea and adjacent waters. An analysis of the regulatory and organizational and economic mechanisms for preventing plastic pollution of the Arctic seas and coasts of the Arctic Council member states and practices of their application is carried out. Particular attention is paid to the control and supervision over litter collection onboard and the efficiency of its disposal after delivery to the land. To improve the legal regulation of handling waste of production and consumption, it is justified to adopt the draft federal law "On secondary material resources"; to create a financial platform for the circular economy in analogy with the European Union and to develop technologies to increase the life cycle and reuse of goods made of plastic. To supplement to the activities of the "State Program Social and Economic Development of the Arctic zone of the Russian Federation" and the state programs for social and economic development of the Arctic, it is proposed to include various types of plastic in the list of hazardous pollutants of water areas and coasts of the Russian Arctic and to build facilities for processing of plastic wastes from fishing enterprises in the Arctic. Also, the regional authorities should encourage volunteering for cleaning coasts of the Barents Sea from garbage, incl. plastic.

Keywords: *The Barents Sea, plastic pollution, climate change, maritime activities, ecological and economic damage, circular economy.*

Introduction

The problem of plastic pollution of the oceans and seas was recognized by the world community and at the international level, in particular, by the UN, even before it had become one of the most important environmental problems of the world. In our opinion, the preface for that is the fact that UNESCO included the issue marine resource use in the list of global problems, while the handling of plastic waste on land still has the status of a regional or local problem and, less commonly, a national problem.

The first international conventions on the rational use of the marine resources and the protection of waters from pollution were adopted in 1960¹.

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In the 1950s-1960s, the industrial production of the most common types of plastic used to produce disposable tableware, packaging, bottles, containers, bags, etc., was not developed (polypropylene, polystyrene) or they had not been created by science (polyethylene terephthalate).

It was during these years that the threat of not only the more intensive use of the oceans as a dumping ground for industrial and household waste for the economies of the world, quickly recovering after World War II, but also turning it into a nuclear repository, increased.

It must be admitted that today one of the largest repositories of radioactive waste, chemical weapons and the site of nuclear submarine accidents is the bottom of the most developed sections of the World Ocean. This fully applies to the Barents Sea, its adjacent waters and shores. As we know, in the 20th century, the Soviet Union conducted ground, underground and underwater tests of atomic and hydrogen weapons on the islands of the Novaya Zemlya Archipelago, flooded nuclear reactors of icebreakers and submarines in the Kara Sea. Russia, like the USSR's successor in the "nuclear club", flooded containers with radioactive waste into the sea until 1991. Monitoring containers with radioactive waste and submerged nuclear reactors showed that they are "time bombs" since they are metallic containers stored in a chemically aggressive marine environment for no more than 15 years. Some of them are about 25 years old. However, if they were embedded in lead and plastic, they will be safe for at least 500 years.

Each plastic bottle trapped in seas also represents a "time bomb", since the useful properties of the plastic are resistance to the effects of many environmental factors (ultraviolet, low and high temperatures, solvents, etc.) i.e., durability. According to experts, plastic products decompose 100 - 500 and sometimes even 1000 years. If the influence of ultraviolet radiation, mechanical and other factors fasten the destruction of plastic, it will turn into a microplastic, even more, destructive for all living beings in the oceans.

Of course, it is difficult to change people's opinion about the power of the ocean, its vastness, its ability to absorb ships and islands, destroy settlements and civilizations that had taken shape over thousands of years, as well as the fear of mankind over the ocean. The idea of the ocean's power was based on the persistent belief that using its waters to bury various wastes would not cause significant harm to the ocean, and it had not yet been eradicated in the minds of individuals and governments engaged in its pollution. E.g., during a sea voyage, an aircraft carrying cruiser, such as the "Admiral Kuznetsov" leaves several hundred thousand plastic bottles and other containers from under fresh water that is legally thrown overboard in those areas of the ocean where the international law allows to do it. It is obvious that a fire on a military vessel should not be allowed, also because of its cluttering up with garbage, and saving the life of a sailor or fisherman is a priority for the maritime activity. However, with reference to this priority, sometimes an elementary and thoughtless economy is concealed, political differences between coastal states

¹ UN Convention "On the Open Sea", April 29, 1958, International Convention for the Safety of Life at Sea (SOLAS). 1960.

and an archaic idea of the unlimited resources of the ocean, incl. for the disposal of waste, garbage, etc.

Of course, plastic pollution of the ocean by two dozen aircraft carriers can, figuratively speaking, be called "a drop in the sea". But it should be noted that today the geopolitical situation in the world and in the Arctic becomes similar to the "cold war" years: the countries of the Arctic Union form the Arctic troops and create the infrastructure for their arrangement, modernize weapons in the "polar version" ice-class ships, airfields, etc. Political scientists are discussing the possibility of a new round of nuclear threats and, as a result, an increase in the radioactive contamination of the Arctic. In other words, the anthropogenic load on the ecosystem of the Barents Sea from strengthening the military and defense complexes of the Arctic Union increases markedly.

It should be noted that in recent years, the peaceful development of marine economic activities in the Barents Sea has been significantly developed. First of all, this is the development of the merchant fleet, which uses the ice-free port of Murmansk to transport, e.g., Kuzbass coal, minerals and other goods. A further increase in the volume of cargo transshipment in the port of Murmansk is planned, transshipment terminals and the corresponding land transport system are planned and partly built. Murmansk has a base of atomic icebreakers, used to escort vessels, incl. foreign ones, along the Northern Sea Route to the eastern areas of the Russian Arctic, where several ports are modernized and built, and then to the Bering Strait.

Despite the complex of organizational, economic, technical and political problems of the fishing industry of the North during the entire period of market economy transformation, its fishing fleet remained. It lost more than third ships compared to the Soviet period. Today it consists of 197 sea fishing vessels and 60 small size vessels of coastal fishing. As of January 1, 2018, 166 organizations were engaged in sea fishing. In the Murmansk Oblast — 33².

A noticeable recovery in the Russian Arctic was received by sea tourism. This was largely due to the visa-free regime of visiting the town of Murmansk by ocean liners and the establishment of the Russian Arctic National Park — a unique tourist site. Also, we observed a rapid growth of recreational marine fisheries. Its center in the Murmansk Oblast is the settlement of Teriberka. An increase in the scale of recreational fishing of the Atlantic salmon carried out by foreign tourists on the Kola Peninsula rivers was also visible.

The objectives of our study are to determine the contribution of each type of marine activity to plastic pollution of the Barents Sea, adjacent waters and coasts. In addition, one of the goals of our work is to determine, at least as a first approximation, the magnitude of the damage from the current level of plastic pollution for various types of marine activities.

Most of the plastic that pollutes the seas and oceans get there from land, where it is produced and used. The main routes of plastic pollution are rivers and bays flowing into the sea, as

² Ministerstvo ekonomicheskogo razvitiya Murmanskoy oblasti. Buklet. Rybopromyshlennyy kompleks Murman-skoy oblasti. 2016 g. [Ministry of Economic Development of the Murmansk Oblast. Booklet. Fishing complex of the Murmansk Oblast. 2016]. [In Russian]

well as the flow of plastic debris from the coastlines. Then ocean currents and winds carry plastic trash around the waters of the seas and oceans, or again “throw” it onto the coast. The rivers of the Arctic Ocean seas basins have significant differences from the rivers that flow into the southern seas. First of all, their shores are much less populated and often a large part of the catchment area of the northern rivers falls on completely deserted territories. Therefore, the statement that the northern rivers are the main source of plastic pollution of the Barents Sea needs further confirmation.

However, it does not require any proof of the fact that the largest settlements on the Arctic Circle are located on the coast of the Barents Sea and the nearby part of the Norwegian Sea. In Russia, it is Murmansk, Severomorsk and Polyarny; in Norway — Vadso, Kirkenes, Vardo and Hammerfest. Like all coastal cities and towns, the polar ones also have problems with sewage treatment. Some of them are still being dumped into the nearby bays either directly into the sea without any cleaning or only after mechanical cleaning, during which only large and heavy fractions of garbage are trapped. Utilization of large objects accumulated on the grids of the treatment facilities cause problems for water utilities in the northern settlements: no shot-locks, debris that is not subject to fragmentation has no place to be taken or it is not profitable to do, etc. In small settlements on the coast of the Barents Sea, landfills for waste that meet environmental requirements have never been created. Landfills are found almost everywhere, incl. unauthorized ones. Even if landfills are far from the coast, the strong winds of the Barents Sea and streams of melt water spread the garbage and a part of it falls into the sea.

One of the directions of the recent Russian state environmental policy is the problem of handling production and consumption waste, incl. the Arctic territories of the Federation. The latest regulatory act of the government was adopted in January 2018 — “Strategy for the Development of Industry in the Treatment and Disposal of Production and Consumption Wastes until 2030”³.

To identify the trends of plastic pollution in water areas and the coast of the Barents Sea and adjacent waters, it is logical to rely on the forecast for the development of production of plastics and its use in the world and in our country.

Only 155 years have passed since the invention and first commercial use of plastics by Alexander Parks. During this relatively short period for the history of mankind, plastics have spread throughout the world and have been used in every field of human activity. It took about the same amount of years for aluminum to become the main construction material. Currently, plastic is also the main structural material, and according to some forecasts, plastics may be ahead aluminum in the near future.

³ Rasporazheniye Pravitel'stva RF ot 25 yanvarya 2018 goda № 84-r “Ob utverzhdenii Strategii razvitiya promyshlennosti po obrabotke, utilizatsii i obezvrezhivaniyu otkhodov proizvodstva i potrebleniya”. [Order of the Government of the Russian Federation of January 25, 2018 No. 84-p “On Approval of the Industry Development Strategy for the Treatment and Disposal of Production and Consumption Wastes”]. URL: <http://government.ru/docs/31184/> (Accessed: 01 September 2018). [In Russian]

Today plastics are used in mechanical engineering, in all sectors of transport, in construction, in electrical and radio engineering, in agriculture, in medicine and in everyday life. Modern tools for the extraction of aquatic organisms, unlike those used in fisheries half a century ago, are usually composed of plastic and metal. And the cheapest types of plastic are used for packaging, dishes, clothing and cosmetics, i.e. for the production of goods used once or relatively quickly turn into waste.

Several hundred types of plastics have been created, and their invention continues. Since the mid-1990s, attempts to create a bioplastic are going on, e.g., from starch, vegetable fats, sugarcane and other types of reproducible raw materials. They can decompose from polymers to monomers under the influence of various microorganisms or only sunlight. Several types of bioplastic have already been obtained, but its mass production has high cost-effectiveness and is opposed by oil, gas and coal companies that produce raw materials for the traditional plastics production.

It should also be noted that a possible transition to the use of bioplastics will not affect those industries where plastics are replacing metal today, or where plastic has more properties than natural materials, e.g., in the production of modern fishing gear (networks, traps, trawls, longlines, etc.). However, their mass use will allow reducing the volume of plastic garbage from households, tourism industry and from everywhere where one-time packaging or dishes are used.

In 2015, the volume of polymers consumption in the world exceeded 235 million tons. Polyethylene accounts for the largest share of consumption (about 38%), polypropylene takes the second place (about 26%), polyvinyl chloride takes the third place (about 18%)⁴. By 2030, the world may expect a further increase of the specific consumption of polymer products per capita. It will lead to an increase in consumption to \$ 140 per person instead of \$ 61 per person in 2013.

In terms of production and consumption key indicators for chemical products, Russia lags significantly behind world leaders (Japan, Germany, France, Italy, Great Britain, etc.) and even from the People's Republic of China, which is not among the world leaders. Home consumption of the chemical products in Russia depends on imports, whose share in 2014 was 40%. The same year was marked by the adoption of the "Strategy for the Development of the Chemical and Petrochemical Complex of the Russian Federation for the Period up to 2030", which includes 2 development scenarios: with and without state support⁵. If the state does not have the means to support the industry, the growth in consumption of plastic products will still be observed. It will reach 79.4 kg/person by 2030 compared with 30.2 kg/person in 2012. However, it will be signifi-

⁴ Rynok krupnotonnazhnykh polimerov. Chast' II. [Market of large-capacity polymers. Part II] URL: <https://dcenter.hse.ru/data/2017/01/31/1114339135/> (Accessed: 01 September 2018). [In Russian]

⁵ Prikaz Ministerstva promyshlennosti i torgovli RF ot 8 aprelya 2014 goda № 651/172 "Ob utverzhdenii Strategii razvitiya khimicheskogo i neftekhimicheskogo kompleksa na period do 2030 goda" (s izmeneniyami na 14 yan-varya 2016 goda). [Order of the Ministry of Industry and Trade of the Russian Federation of April 8, 2014 No. 651/172 On approval of the Strategy for the development of the chemical and petrochemical complex for the period up to 2030" (as amended on January 14, 2016)]. URL: <http://docs.cntd.ru/document/420245722> (Accessed: 01 September 2018). [In Russian]

cantly lower than the predicted level of plastic products consumption in the world (140 kg/person in 2030). With the state support of the industry and favorable macroeconomic factors (high oil prices, etc.), the average per capita for consumption of plastic products in Russia will rise to the level of developed countries by 2030. The highest rates of consumption growth will be observed in construction, primarily road construction, in housing and utilities, in the automotive and food industries. According to the developers of the Strategy, "plastic products will smoothly push out paper and foil from food packaging". The outpacing rates of growth in the production of polymers will reduce the share of their imports in home consumption to 5–10%.

As we know, all types of modern traditional plastics are created from non-reproducible natural resources — oil, coal and gas, and they are also used as necessary additives in the production of bioplastics. A purely theoretical relationship has been proven between the production of hydrocarbons and plastics in the country: the greater the resources and hydrocarbons production, the greater the opportunities for the development of home polymers production. On the other hand, it is possible to import plastic from other countries using the income from the sale of hydrocarbons.

But we would like to draw attention to the problem of hydrocarbon pollution of the seas of the Arctic Ocean and the object of our study — the Barents Sea. This problem is urgent today, as it was evidenced by the ongoing protests of international public environmental organizations (Bellona and Greenpeace) and their Russian divisions against the development of hydrocarbon deposits in the Arctic and, above all, in its Russian part.

The explored reserves on the Arctic shelf make up 25% of the world reserves of hydrocarbons materials or a quarter of Russian oil reserves and half of the gas reserves. The potential reserves in the Barents Sea and Kara Sea (more than 80% of oil and gas) are estimated at 140–180 billion tons of conditional fuel. The Barents Sea accounts for 49% of the total reserves at the Arctic shelf.⁶ The strategy for the development of hydrocarbon deposits in the Arctic is well known. It is the basis of the State program for its social and economic recovery. But not only Russia implements such a strategy. In 2016, Norway began operating the "Goliath", an oil field in the Norwegian sector of the Barents Sea, 88 km North-West of Hammerfest. After the Russian-Norwegian Treaty on the Delimitation of Maritime Spaces and Cooperation in the Barents Sea and the Arctic Ocean in 2010, oil companies stepped up their exploration of hydrocarbon resources in the Norwegian sector.

In other words, today we are facing a real threat of damage to the Barents Sea eco-system from pollution by hydrocarbons, which are comparable in force to and even exceeds the threat of radioactive contamination.

Not only the public environmental organizations, but also many environmental scientists have no doubt that as the investment projects of Russia and Norway are implemented to develop

⁶ Osadchiy A. Neft' i gaz rossiyskogo shel'fa: otsenki i prognozy [Oil and gas of the Russian shelf: estimates and forecasts]. URL: <https://www.nkj.ru/archive/articles/6334/> (Accessed: 01 September 2018). [In Russian]

new fields, build large-scale offshore facilities and terminals on artificial islands for transporting oil and gas, the threat of pollution will only increase.

Mining companies fear that in case of accidents, leaks, collisions of platforms with icebergs, they will pay heavy fines and incur serious losses. In this regard, all technologies of extraction and transportation of hydrocarbons in high latitudes, as well as methods of preventing environmental damage, are constantly and actively improved, and huge financial resources are allocated for this. E.g., in recent years, special attention has been paid to the study of the impact of the Arctic climate change on the oil and gas industries on the shelf of the Arctic Ocean and on the safety of transportation of hydrocarbons in the Arctic seas.

In our opinion, the study of the plastic contamination degree of the Barents Sea and its adjacent waters is the first and necessary step for a further comprehensive study of the factors that contribute to it and technical and technological methods of its prevention and elimination.

Methods and results of assessing the plastic contamination level by in the Barents Sea and the damage it causes to ecosystem and major marine activities

The first international agreement on the prevention of pollution from seas and oceans with plastic from ships — MARPOL 73/83 — was adopted under the auspices of the International Maritime Organization (IMO) in 1978 as an annex to the International Convention for the Prevention of Pollution from Ships by Oil of 1973. Today, every Russian ship must strictly comply with the rules of MARPOL 73/83, since our country is a member of IMO and ratified this convention in 1983. There is no doubt that the IMO would accept the application to the international convention on plastics MARPOL 73/83. But, as in the case of oil pollution, it reflects the economic problems of ocean resources.

Also, in the 1970s — 1980s, there was a rapid growth of scientific attention to oceanology around the world. E.g., Alfred Wegener's research institute for polar and marine studies (Germany) was established in 1978. Also, during this period, the material and technical base of marine research increased noticeably. In 1978, the first satellite was launched to solve the problems of oceanographic research centers.

All maritime powers actively developed the network of their national marine fishery research institutes. The network of basin applied research institutes exists in Russia today. It has 13 organizations of the fishery industry, and it was also most actively formed in 1970–1980.

Today, it is believed that Charles Moore, who was a participant of the Trans-Pacific Yachting Race in 1997, accidentally “discovered” a large Pacific garbage cans, drew the attention of the public of the world to the ecological side of the plastic pollution of the seas and oceans. Of course, it is difficult to believe that in the age of space flights, these big “trash spots” were not known before Charles Moore. But he earned the worldwide discovery of it only because he gave 20 years of his life for investigating plastic pollution in the Pacific; created the Algalita Foundation, whose mission is to deal with plastic pollution through training and equipping everyone who wants to save

the ocean⁷. In our opinion, Charles Moore is a living moral example for contemporaries, since the education of people with such a responsible attitude to nature is the goal of an expensive system of environmental education today.

Currently, many intergovernmental and governmental organizations have been created to deal with plastic pollution of water and land, as well as funds that finance various public associations: from environmental to youth (German Heinrich Böll or Ellen MacArthur foundations and others).

One of the most well-known intergovernmental organizations in the world, the OSPAR Commission, established by the Convention on the Protection of the Marine Environment of the North-East Atlantic in 1992. It brings together 16 countries, incl. 5 countries of the Arctic Council, except Russia, Canada and the USA⁸. The OSPAR Commission attracts local people to data collection on pollution of sea coasts by filling in a specially designed questionnaire that lists all possible types of garbage, incl. plastic. A completed application form must be sent to a specific address. Recently, some other organizations, incl. Russian ones have begun to use this method for obtaining data on coastal pollution.

Surveys of coastal residents, fishermen, tourists or volunteers, and garbage collection in sea waters and on the coasts are an empirical method of observation, which is mainly practiced by various scientific institutions. Scientific institutions, of course, go further and apply methods of description and comparison. Also, the methods of observation as the development of special devices and other technical means are becoming more complex, and the analysis of their results can be done only by scientists or specially trained people.

The predominant use of observation, description and comparison is due to the huge gap in information about the volume and composition of plastic garbage in the oceans, their parts and seas. It should also be noted that to obtain data on the amount of plastic contamination, its migration routes and the impact on ocean biodiversity, it is impossible to apply the experimental methods due to the impossibility of isolating the studied object from the influence of adverse circumstances and external factors. E.g., the experiment of a German scientist Georg von Neumayer's on throwing bottles overboard into the sea to explore global ocean currents and open more efficient shipping routes is perceived a joke. The experiment of the German Maritime Observatory began in 1876 and lasted 69 years. Over the years, several thousand bottles thrown overboard, less than

⁷ Algalita is a nonprofit organization committed to solving the plastic pollution crisis in our oceans through research and education. URL: <http://www.algalita.org/> (Accessed: 01 September 2018).

⁸ Pros'ba Komissii OSPAR o predostavlenii statusa nablyudatelya v sootvetstvii s punktom 1(d) pravila 82 Pravil protsedury Assamblei. [Request by the OSPAR Commission for observer status in accordance with Rule 82, paragraph 1 (d) of the Rules of Procedure for the Assembly] URL: https://www.isa.org.jm/sites/default/files/files/documents/isba-16a-inf2_1_1.pdf (Accessed: 01 September 2018). [In Russian]

one thousand were caught and returned to the address found in the note. The last bottle was caught in 2018. It was in the water 134 years⁹.

Thus, now, the joint efforts of scientific institutions, environmental organizations and ocean protection enthusiasts are going on to accumulate knowledge in three main areas:

- determination of the contamination degree of various types of plastic and microplastic of specific parts of the ocean and its coasts;
- determining the impact of plastic pollution on ocean biodiversity, its inhabitants, and ecosystems;
- determination of economic damage to various types of marine activities.

In addition, today, almost all studies of ocean pollution are related to the determination of the global climate change impact. Many scientific research institutes are moving from the studies of the effects and consequences of climate change to complex studies.

In our opinion, researching ocean pollution with plastic won't take a long time that humanity needed to discover, map, and get a general idea of the World Ocean geography and its main characteristics. First, the UN's firm determination, which was again demonstrated at the World Summit on the World Ocean (Bali, February 2017) and the Ocean Conference (New York, June 2017), will contribute to the achievement of the goal of sustainable development No 14 "Conservation and rational use of the oceans, seas and marine resources in the interests of sustainable development" and the measures taken to find and to solve the problem of preventing the plastic pollution of the World Ocean and its recovery^{10,11}.

Secondly, the important factors for obtaining results are the sharply increased scientific and technical level of the equipment of scientific research and marine scientific expeditions and the degree of safety of navigation.

These factors are of particular importance for studies of the Arctic Ocean, which, although it is the smallest and shallow among the oceans of the Earth and surrounded on all sides by the continents but surpasses all other oceans with the severity of climate and the dangers of polar ice and water (below 5 degrees of heat), icebergs, tidal currents and even such a representative fauna as a polar bear. Therefore, the entire history of geographical discoveries in the NLO, scientific research and development of the islands and its coasts is undoubtedly recognized as heroic, since it was created on the verge of human capabilities and often due to the lives of pioneers and travelers.

Despite the fact that the safety of navigation in the Barents Sea and in adjacent waters has increased significantly, there are other factors that impede scientific research. Among them, first

⁹ Drevneysheye poslaniye v butylke pribilo k beregu. [The oldest message in the bottle washed ashore]. URL: https://weekend.rambler.ru/items/39304233/?utm_content=rweekend&utm_medium=read_more&utm_source=copylink (Accessed: 01 September 2018). [In Russian]

¹⁰ OON namerena borot'sya s plastikovymi otkhodami v Mirovom okeane. [UN intends to fight with plastic waste in the oceans]. URL: <https://news.un.org/ru/story/2017/06/1305751> (Accessed: 01 September 2018). [In Russian]

¹¹ Nashi okeany — nashe budushcheye: partnerstvo v interesakh dostizheniya tseli 14 v oblasti ustoychivogo razvitiya. [Our oceans are our future: partnership to achieve sustainable development goal 14] URL: <http://www.un.org/ru/conf/ocean/index.shtml> (Accessed: 01 September 2018). [In Russian]

of all, one should point out the remaining bans for their implementation for political reasons, including the need to ensure the military security of coastal states.

A review of research into the problem of plastic pollution of the Barents Sea and adjacent waters showed that, as of today, the greatest contribution to its solution belongs to scientists of the Alfred Wegener Institute (Germany). Its research vessels conduct expeditionary research in all oceans, and the accumulated information has already enabled them to create LITTERBASE — a database of ocean pollution and its map¹².

In the Barents Sea, the Institute had only 14 expeditions out of the total number (1,249), the LITTERBASE data does not reflect the situation with plastic pollution in this area. However, research methods used at the Alfred Wegener Institute are the most developed and widely borrowed by other scientific institutes, universities, and even environmental organizations [1, Geyer R., Jambeck J.R. et al.].

Marine debris is distributed to the most common types (wood, glass/ceramics, metal, plastic, etc.), and plastic garbage is separately divided into its types: plastic fibre, plastic film, plastic in granules, foam polystyrene, etc. Catch and garbage collection is carried out, as far as possible, on the surface of the sea, at a depth (in the water column), at the bottom and on the coasts.

Data analysis allows us to draw the following conclusions: plastic absolutely dominates in all studied environments of the sea. Its share varies from 47% at the bottom and up to 77% at the surface (Table 1). The largest proportion is accounted for plastic used for fishing (nets, longlines, trawls, fish crates, product packaging, buoys, etc.). It should be noted that these types of large plastic are mainly found not on the surface, but in the water column or on the bottom (see Table 1).

Table 1

*Shares of various waste (>= 5mm) in its total composition, in the water column, on the bottom, on the surface and on the beaches, %**

Type of sea waste	Global composition of marine, %	Litter types in the water column, %	Litter types on the sea-floor, %	Litter types at the sea surface, %	Beached litter types, %
Biotic	1.3				
Fisheries (metal)	1.3				
Fish stocks	3.1		10.74		
Glass ceramics	3.2	5.63			4.02
Metal	3.71	9.59	8.77		
Different types	4.8			6.58	5.71
Paper/cardboard	1.7				
Rope	1.5		3.7		
Textiles/fabrics	1.2				
Wood	2.3			3.57	
Cigarette packs	2.9				
Plastic, total	59.74	51.75	47.06	76.87	57.67
Incl.: fishing (plastic)	8.03	22.93	11.97	3.21	8.29

¹² Online Portal for Marine Litter. URL: <http://litterbase.awi.de/> (Accessed: 01 September 2018).

Plastic fiber	7.05				
Polyethylene film	8.4				
Plastic granules	1.3				
Styrofoam	4.6			3.0	7.05
Other	4.0				

Source: LITTERBASE. URL: <http://litterbase.awi.de/> (Accessed: 01 September 2018).

* An empty cell means that the proportion of this garbage type is extremely small in this column.

Particles with a size 0.5-5 mm are micro-waste (even smaller particles are called nano-waste). The ranking of micro-waste types largely coincides with the findings of large debris (more than 5 mm): microplastic predominates, except for beaches (Table 2). The prevailing types of microplastics: plastic fibre occupy the first place (everywhere except beaches), followed by plastic granules and foam plastic. It should be noted that scientists still do not have complete clarity on how plastic turns into microplastic and how it migrates over the ocean. Also, many of its types have not yet been identified or their content in water has not been determined [2, Lusher A.M.].

Table 2

Shares of various micro-waste (≥ 5 mm) in its total composition, in the water column, on the bottom, on the surface and on the beaches, %*

Types of micro-waste	Litter types in the water column, %	Litter types on the seafloor, %	Litter types at the sea surface, %	Beached litter types, %
Different types	15.63			0.51
Plastic fiber	14.21	19.91	10.01	27.05
Polyethylene film		2.42	0.82	0.47
Plastic granules	1.93	2.5	2.43	38.12
Plastic total	77.8	72.89	82.03	28.25
Fishing (plastic)				0.39
Styrofoam	1.55	1.01	3.27	4.74
Biotic		0.62		
Rope		0.33		
Glass ceramics				0.31

Source: LITTERBASE. URL: <http://litterbase.awi.de/> (Accessed: 01 September 2018)..

* An empty cell means that the proportion of this garbage type is extremely small in this column.

Therefore, generalizations on its content in sea waters and on the coast or even the results obtained in specific areas, still are the first approximation. E.g., scientists from the RAS Institute of Oceanology named after P.P. Shirshov hypothesized that microplastic migrates in the ocean like amber which has the same density as the majority of the plastic types. Observations of amber migration have been carried out for hundreds of years, scientists believe that it is possible to assume how microplastic particles will migrate [3, Chubarenko I., Stepanova N.].

Scientists from Russia and Norway, who study the ecosystems in the Barents Sea and adjacent waters and their reserves of aquatic organisms, also observe the garbage in the aquatic environment.

The results of observations of the Polar Scientific Research Institute of Marine Fisheries and Oceanography (PINRO, Russia) and the Marine Biological Institute (BIMI, Norway) showed that the main components of the floating garbage on the surface of the Barents Sea and in its depths in

2011–2016 were objects made of paper, plastic, metal, rubber, glass, textiles and wood, incl. their various combinations (Table 3) [4, Krivosheya P., Prokhorova T. et al.].

That time, garbage was observed everywhere in the entire water area of the annual Russian-Norwegian trawl survey aimed at studying fish stocks and covering the geographical limits of the Barents Sea and some parts of the Norwegian and Greenland Seas limited to the west by the continental slope.

Objects of garbage were observed both on the surface, in the depth and at the bottom. Objects on the surface often included floating parts of logs, trees and plastic. Bottom trawling brought metal, wooden and rubber-made objects..

Table 3

The frequency of anthropogenic debris in the Barents Sea and adjacent waters noted by the Russian-Norwegian ecosystem surveys in 2011–2016.

Years	Type of debris		
	Metal	Wood	Plastic
2011	0.4	1.8	12.0
2012	0.1	1.8	20.6
2013	0.7	3.7	14.0
2014	0.2	-	5.4
2015	0.4	1.5	18.8
2016	0.7	3.0	12.7

In most cases, the plastic noted in the trawl catches was represented by pieces of fishing gear, parts of equipment used in aquaculture and various packaging. The second, less common component of garbage was wood. It could be assumed that this garbage came to the Barents Sea from the eastern Arctic seas. It entered these seas with the runoff of Siberian rivers. Even more rare component of pollution is metal.

The frequency peaks of plastic debris in catches in the Barents Sea and adjacent waters were observed in 2012 and 2015. Now, it is not possible to be confident about the reasons for the observed maxima. Potentially they may be the commercial activity, which coincided with stormy days, increased wind activity over the northeast Atlantic and others. [5, Grøsvik B.E., Prokhorova T.].

Our international research project MARP (Marine Aggregate Resources and Processes) “Plastic Pollution of the Arctic Waters: Origin, Status, Costs and Incentives for Prevention” (2016–2018) was implemented together with the Norut Research Institute (Norway), the Arctic University of Norway, UiT (Norway), the Plymouth Marine Laboratory (UK), the Norwegian Polar Institute (Norway) and the Institute of Economic Problems of the RAS Kola Scientific Center (Russia). The goal of the project was to provide data on the pollution of the Barents Sea and adjacent waters. The determination of plastic pollution in adjacent waters, e.g., the waters around the Spitsbergen (Svalbard) Archipelago, is very important for the Norwegian project participants. This is so not only due to Norway’s well-known political claims to sole management of the archipelago, but also due to the increase in plastic pollution of this area [6, Jambeck J.R., Geyer R. et al.].

An evidence of the plastic contamination is trash caught in the water adjacent to the Svalbard archipelago and stored at the waste disposal station in the Norwegian village of Longyearbyen

(Fig. 1). In September 2016, the project participants sorted this marine litter using the OSPAR methodology.



Fig. 1. The waste disposal station in the village of Longyearbyen.

As a result, the most common types of garbage were identified. Fishing plastic (nets, buoys, fish crates) was in the first place — 92%. Shares of other types of garbage ranged from 1% and less and were distributed (to reduce the share in the total volume of garbage) as follows: fabrics, ceramics/glass, rubber, cardboard, etc.

As a supplement to the research method based on the level of plastic contamination, our project addressed the problem of determining the source of plastic waste, i.e., the country of its production. It is clear that a reliable determination of the vessel's origin or the coast from which this garbage got into the sea is practically impossible. It was also not possible to identify the country-producer of the largest amount of plastic but judging by the remaining labelling of the manufacturers on some types of garbage, the largest contribution was made by the Nordic countries. Unfortunately, the time period during which the Norwegians caught sea garbage and stored it at the waste sorting station was unknown. Among the items were, e.g., builders' plastic helmets with inscription "Glory to the CPSU" or plastic bottles for drinks of famous world brands existed for decades. Also, the participation of experts from the fishermen unions and associations of Russia and Norway made it possible to establish that fishing plastic, e.g., nets, ropes or floats, was produced and used in different years.

In our opinion, the identification of the country-producer of the plastic found at sea is not enough to compile a hierarchy of countries that are guilty of plastic pollution. It is impossible to ob-

tain reliable information about the primary cause of pollution by one or another country, production and sales of plastic products around the world, pollution of sea waters from vessels or their transfer by sea currents in the water area and to the shores of other countries. All available conclusions on this issue are political or speculative.

One of the project's objectives is to assess the threats to various types of marine activities and, above all, the existing and possible damage to the fishing activities in the Barents Sea and adjacent waters. At the initial stage of the study, a survey of Russian and Norwegian fishing companies was completed in November 2017 -February 2018. In the online questionnaire, there were 25 questions. They could be answered by that the owner of the vessel, its captain or other employees of the fishing company. To answer the question on a type of garbage found in catches, it was possible to choose among the most common types of marine garbage.

Much attention was paid to the fishermen's proposals to improve the management of plastic waste handling on the vessels and in the ports and to reduce the amount of waste produced on the vessel. It was also proposed to agree (fully or partially) or not with several statements related to the plastic pollution, assessing its threat to fishing, and responsibility for the pollution of the sea of a particular vessel or a certain country.

The Russian side was able to give answers from 26 fishing companies through the Union of Fishermen of the North. The Norwegian side also faced low activity of fishing companies. The most common answers by representatives of Russian companies are in Table 4.

Table 4

Preliminary survey results of the fishing companies on the plastic pollution of the Barents Sea and adjacent waters

Questions	The most common answers
What type of waste did you encounter in the catches?	<i>Household waste; waste associated with fishing.</i>
What items most often fall into the sea from your vessel?	<i>Home waste (e.g. food containers, bottles, detergent containers); fishing nets (parts of fishing nets); floats, reels, buoys, trawls; packaging materials related to industrial production.</i>
How can you reduce the amount of waste produced on your vessel?	<i>To take less packaging from goods used in everyday life on board ; products are pre-packaged, so it's not possible to reduce waste.</i>
Do you agree with the following statements?	<i>I completely agree: I throw plastic garbage overboard, because a small amount of plastic garbage thrown into the sea does not matter. Sea litter probably will not cause lasting damage. In general, Russian fishermen do not dump plastic waste into the sea. Most of the garbage in Russian waters comes from afar. I am concerned about the reputation of Russian fish due to pollution of the ocean.</i>

Only one Russian company indicated the presence of economic damage from plastic garbage, although most of the surveyed companies answered affirmatively to questions that garbage caught along with the catch negatively affects the working environment, reduces the quality of the catch, etc. In addition, cleaning fishing gear from debris for one fishing day by Russian fishermen spends an average of 15 to 30 minutes and has to be cleaned at least once a month.

According to preliminary data from a survey of Norwegian companies, 54% of them admitted that they are losing working time to clean fishing gear; 48% noted that garbage spoils nets and other fishing gear. 31% of Norwegian fishing companies have losses from plastic pollution, an average of 10,000 US dollars. Norwegian fishermen believe that other countries are suppliers of marine litter. As well as Russian fishermen, they are worried about the reputation of the home seafood industry due to pollution by sea garbage.

After a complete processing of the survey results and their comparison, the most common answers will be clarified, and the necessary conclusions will be drawn in order to apply direct and indirect methods of assessing the economic damage from plastic pollution to the fishing industry.

Trends in plastic pollution of the Barents Sea and adjacent waters and initial measures for its prevention and elimination

Today, data of scientific and simple visual observation no longer leaves the opinion that the waters of the Barents Sea, its islands, archipelagoes and coasts are polluted with plastic and, despite the measures taken, to control and monitor garbage collection and disposal on vessels, the negative trends prevail.

The main factors contributing to the increase in pollution in the Russian part of the Arctic are:

- development of the plastics industry by home chemical and petrochemical industries, which leads to the expansion of plastic consumption in all sectors of the economy, incl. households;
- active implementation of the national strategy for the economic revival of the Arctic and, above all, the development of new hydrocarbon deposits on the shelf of the Arctic Ocean and the necessary infrastructure and an increase in traffic along the Northern Sea Route.

In 2017, the volume of shipping along the NSR amounted to almost 10 million tons. By 2025 it is planned to increase shipping to 80 million tons per year (excluding the transit of foreign shipping companies). The bulk cargo will be oil, liquefied gas and raw materials for dry cargo vessels. In this regard, the demand for new icebreakers will grow. According to specialists, only in the European sector of the Northern Sea Route, at least four icebreakers will be required by 2025.

As you know, one of the priorities of the State “Strategy for the Social and Economic Development of the Arctic until 2025” is to increase the living standards of northerners and create a comfortable environment for them. The implementation of this complex task is likely to reduce the desertion rate of the Arctic territories observed now. In the conservative version, i.e., the population will remain at the current level or slightly decrease without breakthroughs and cardinal changes for the better. However, even with this option, the growth of plastic consumption in households will increase the volume of plastic waste.

It is also necessary to mention the strategic plans of the fishing industry of the Northern Fishery Basin [7, Kuranov Yu.F.; 8, Vasilyev A.M., Kuranov Yu.F.; 9, Vasiliev A.M.]. The fulfilment of intentions to radically improve the system of taxation of fishing enterprises to reduce its burden

by the government of the country will be a powerful incentive for the modernization and development of the fleet, incl. coastal one, and processing factories. Moreover, the existing tax system makes incomes of fishing and processing companies constantly growing. So, this sector of the economy remains attractive to businesses.

A subjective factor contributing to the strengthening of the negative trend of pollution of the Arctic Ocean with plastic waste today is the absence even mention of the threat of pollution of the seas and, as a result, measures to prevent it in all legal regulations on the development of the Russian part of the Arctic. The recognized priority for ensuring the environmental safety of the Arctic is the protection of its waters from hydrocarbons' pollution and from the negative effects of climate change, and its islands and coasts — from historically accumulated garbage, or containers from fuel mostly.

Meanwhile, today it is possible to justify *the factors that will contribute to the turn of the situation with plastic pollution of the Barents Sea and other areas of the Arctic Ocean.*

First of all, *it is the strengthening of the international protection of the resources and ecosystems of the oceans, outlined in the latest UN documents, which imply the adoption of similar actions by national governments.* Russia will not be an exception among the UN member states in joining the solution of the problem.

At the national level, an important factor in the prevention of plastic pollution will be *the implementation of two interrelated reforms of the state environmental management and environmental protection: 1) handling production and consumption waste and 2) rationing and promoting environmental protection activities.* Both reforms started in 2014 and today it is possible to see a significant progress.

Fundamental changes were made in the Federal Law “On Production and Consumption Wastes”. In accordance with it, the development of territorial waste management schemes and regional programs, the creation of a regional operator for waste management, the responsibility of Russian producers and importers of certain goods, etc. were legally secured.

It would not be superfluous to conclude that today the country has developed the conditions for the transition to a new waste management system largely based on borrowing the provisions of the EU Directive 2008/98/EC on waste (Waste Framework Directive)¹³. “Prevention of the waste generation” is at the top of the waste management hierarchy, followed by reuse (and preparation for it), recycling, use and disposal.

It is easy to see that the Russian reforms were aimed at “preventing the generation of waste”. Since 2016, Russian producers of certain goods and their importers have been obliged to annually ensure the disposal of their waste in an amount of up to 30% (a recycling rate) of goods released into circulation in Russia in the previous year. The list of goods and their packages to be recycled after losing consumer properties, includes 54 groups of goods, except for food and raw

¹³ The EU Directive 2008/98/EC on waste (Waste Framework Directive). URL: <http://ec.europa.eu/environment/waste/framework/> (Accessed: 01 September 2018).

materials. In particular, the group No 21 “Plastic packaging products” includes bottles, vials and similar products made of plastic; ethylene polymer bags; bags made of other plastics masses; boxes, crates, baskets and similar plastic products; other plastic packages.¹⁴ The recycling rate for these goods is 10% in 2018 and will be 20% in 2020.¹⁵ In fact, the list of goods to be recycled after losing consumer properties contains all types of packaging goods, incl. those made of various polymers. An environmental fee is established for businesses and organizations not willing to recycle waste. E.g., the fee for group No 21 “Plastic packaging products” is 3,844 rubles per ton.

At the beginning of 2018, the Government of the Russian Federation approved the “Strategy for the Development of the Industry for the Processing, Disposal and Recycling of Production and Consumption Wastes”. Its provisions are the foundations of the state program to be developed to create a recycling and disposal industry in Russia.

Such an industry has already been created in the EU countries, and therefore they are going further. Back in 2015, the European Commission adopted the program “Closing the loop - An EU Action Plan for the Circular Economy”, i.e., an economy that reduces, reuses and recycles waste within the production, circulation and consumption of goods.

Russia is an example of the transition to a circular economy. It is applied to the polymer industry. We are talking about the “State program for the Development of Biotechnology in the Russian Federation for the period up to 2020” or “BIO2020”¹⁶. In accordance with it, since 2014, a plan is being implemented to reduce the use of traditional polymers in the production of food packaging, which is not properly recycled by means of biodegradation, primarily plastic bags and disposable tableware. As a result of the program, bioplastics should take up 10% of the polymer market, incl. packaging — up to 25%.

Recycling of many types of plastics is a difficult problem, since their processing is only possible separately, and some types of plastic waste are not profitable to recycle into secondary raw materials. Currently, the industry is facing the problem of processing mixed plastics waste. Also, the problem of science is the search for new applications of plastic as a secondary raw material. Products made of recycled plastic are inferior in quality to those made of new plastic, therefore, they have a lower price, and their production is non-competitive and unprofitable. Today, recycled plastic is used mainly as a filler for various construction mixtures, facing products, insulation materials, technical structures, fuel, and even electricity items.

¹⁴ Rasporyazheniye Pravitel'stva RF ot 24.09.2015 N 1886-r “Ob utverzhdenii perechnya gotovykh tovarov, vklyuchaya upakovku, podlezhashchikh utilizatsii posle utraty imi potrebitel'skikh svoystv” [Order of the Government of the Russian Federation of September 24, 2015 No 1886-p “On approval of the list of finished goods, including packaging, to be recycled after they lose consumer properties”]. [In Russian]

¹⁵ Rasporyazheniye Pravitel'stva RF ot 28 dekabrya 2017g. № 2971-r “O normativakh utilizatsii otkhodov ot ispol'zovaniya tovarov na 2018–2020 gg.” [Decree of the Government of the Russian Federation of December 28, 2017 No. 2971-p “On standards for the disposal of waste from the use of goods for 2018–2020.”]. [In Russian]

¹⁶ Koordinatsionnaya programma razvitiya biotekhnologii v Rossiyskoy Federatsii na period do 2020 g. (BIO2020), utv. Pravitel'stvom RF 24.04.2012 N 1853p-P8. [Coordination program for the development of biotechnology in the Russian Federation for the period up to 2020 (BIO2020), approved by the Government of the Russian Federation 24.04.2012 No 1853p-P8.]. URL: <http://biotech2030.ru/platforma/strategii-2/> (Accessed: 01 September 2018). [In Russian]

The goal of the reformed state system of environmental regulation and incentives is to reduce emissions of pollutants into the environment through the introduction of a new type of standards (technological) that will stimulate enterprises to introduce the better environment-friendly technologies. The transition period has legally established time limits: the largest environmentally hazardous enterprises in the country will pass through a transition period in 2019–2022. The enterprises which will not meet the standards of the best available technologies for the industry are going to fall under the negative incentive measures, i.e. their fees for environmental pollution will increase by 100%¹⁷.

The collection and recycling of wastewater in the part concerning wastewater treatment of centralized sewage systems (with a volume of 20 thousand m³ per day and more) is assigned to the first category of environmental damage, i.e., it is, for example, water utilities. The transition to better technologies for water utilities and sewage recycling plants of industrial enterprises will reduce the amount of plastic waste and microplastics that are transferred by sewage into rivers and bays.

To reduce the threat of plastic pollution on the Russian seas and land a lot remains to be done at all levels of government in a complex geopolitical and economic situation.

In our opinion, the first steps of the federal regulator should be the further improvement of the regulatory framework of production and consumption waste, namely the adoption of the draft federal law “On Secondary Resources” and the development of a national program to “prevent” the emergence of the waste. This program should include a set of measures to be taken before a product becomes waste. In other words, technologies should be developed to increase the life cycle of goods. These products and goods should primarily include plastics. Its negative impact on the environment and human health has been proven by science. E.g., in Norway, studies on the processing of waste plastic, fishing nets, ropes, and trawls are going on.

It is also necessary to adjust or increase the output of equipment for the processing and recycling of waste to replace the imported analogues, incl. those used on vessels of various types. The necessary technologies and equipment should be innovative and, therefore, their development requires significant financial resources. In this regard, it is advisable to create a financial platform for a circular economy, by analogy with the EU. The development of a circular economy in the EU today is supported by such a powerful financial institution as the European Investment Bank (EIB) and several other banks that support various projects, e.g., for the processing of municipal solid waste. By the end of 2016, the European Investment Program attracted € 164 billion¹⁸.

¹⁷ Federal'nyy zakon “Ob okhrane okruzhayushchey sredy” ot 10.01.2002 N 7-FZ. [Federal Law “On Environmental Protection” January 10, 2002 No.7-FZ].URL: http://www.consultant.ru/document/cons_doc_LAW_34823/ (Accessed: 03 September 2018).[In Russian]

¹⁸ Yevrokomissiya predstavila obzor programmy krugovoy ekonomiki i novoy platformy finansirovaniya. [The European Commission presented an overview of the circular economy program and the new funding platform]. URL: <http://rus.delfi.ee/daily/euroopa/evrokomissiya-predstavila-obzor-programmy-krugovoj-ekonomiki-i-novoj-platformy-finansirovaniya?id=77044912> (Accessed: 03 September 2018).[In Russian]

The Arctic subjects of the Federation are actively involved in the work on the production and consumption waste law (they develop territorial schemes for handling waste; define a regional operator; search, or, as it is in the Murmansk region, have already found an investor for the construction of modern landfills for waste disposal). The subjects have no own funds for developing regional programs to "prevent" the emergence of waste.

In this regard, it is advisable to include actions to "prevent" the emergence of waste, incl. plastic, in the "State Program for the Social and Economic Development of the Arctic".

A social movement for the reuse of things and materials in everyday life does not require any additional investments since it is now widely deployed throughout the world. People are taught to reuse household items, sort garbage and participate in cleanings up in different areas through numerous Internet web pages. Volunteers in Norway helped to clean several thousand beaches polluted with plastic garbage.

We have such events in the Murmansk Oblast as well. In early 2018, the Federal Law "On Volunteering" was adopted. In our opinion, the capacity of regional authorities and public movements in the Arctic regions to clean the coasts of the Barents Sea from debris, incl. plastic is greatly expanded.

As the system develops passive garbage collection in seawater, volunteers can be attracted to clean the surfaces of seas.

Conclusion

Today, in the waters of the Barents Sea, its islands and archipelagoes, as well as the continental coast, there is a negative trend towards increasing pollution by plastic waste.

Scientific data on the pollution of the Barents Sea and adjacent waters by various types of plastics and the damage they cause to marine ecosystems and marine activities are insufficient: more comprehensive and international research is needed, primarily from Russia and Norway.

In the medium term, in the Russian part of the Arctic, there will be at the same time factors that contribute to the growth of plastic pollution and deter it.

Today, one of the subjective factors contributing to the strengthening of the negative tendency of contamination of SLOs with plastic waste is the absence in all legal documents on the development of the Russian part of the Arctic of measures to prevent their pollution of the Arctic seas, including the financing of scientific research.

It is advisable to include various types of plastic in the list of hazardous pollutants in the water area and coasts of the Russian Arctic, by analogy with radiation pollution and hydrocarbons.

The State program for the creation of the industry for the processing and disposal of waste should provide for the development of technologies for the processing and recycling of plastic industrial fishing waste (nets, longlines, trawls, boxes for fish, packaging of products, buoys).

Territorial schemes for the management of waste recycling in the Arctic subjects of the Federation should contain actions for the collection, recycling and disposal of marine debris on the coasts and in coastal waters.

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The Arctic Floating University completed the expedition around Novaya Zemlya *

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Abstract. The article presents a review of the expedition “Arctic Floating University — 2018”, the thematic name of which was “Terrae Novae”. The expedition passed through 3,800 nautical miles along the White, Barents, Kara and Pechora Seas. Its participants completed landings on two arctic archipelagos: Solovetsky Islands and Novaya Zemlya. The expedition had three stages. At the first stage, marine research was made in the White and Barents seas. In total, 48 stops were made, and deep sounding was carried out at each hydrological station. At the second stage, marine and ground research was made in the Barents Sea. The third stage included work on hydrological sections in the Kara Sea and ice condition monitoring along the area. The expedition research team made seven landings on the Arctic archipelagos of Novaya Zemlya and Solovetsky. Samples of soil were taken, and specific studies of the atmosphere, water, marine biology, flora and fauna of the area were carried out. The obtained materials contain new data on the development of a monitoring methodology, assessment of forecasting and prevention of risks associated with biological transport of highly toxic pollutants that can accumulate in food chains and spread to Arctic ecosystems; the study of endoliths; paleomagnetic studies; microplastic studies; marine microfauna for investigating the settling history of the Barents Sea, etc.

Keywords: *The “Arctic floating university”, Novaya Zemlya, marine research, paleomagnetic studies, ecosystem monitoring, microplastic, soil-ecological studies, marine microfauna, anthropogenic impact.*

This year, the scientific and educational expedition “Arctic Floating University” was held for the tenth time. Its traditional organizers are NARFU named after M. V. Lomonosov and Roshydromet in partnership with the Russian Geographical Society.

In July 10 — August 2 2018, the expedition explored the coastal ecosystems of the Novaya Zemlya archipelago, passing it around from the West and East coasts and making major landings in the Russkaya Harbor, on Cape Opasniy, in the Ledyanaya Harbor and Cape Zhelaniya. The key scientific areas for the expedition were: hydrological works in the Barents and Kara Seas; assessment of the pollution degree of the coast; study of the species diversity of flora and fauna of the Novaya Zemlya Archipelago and adjacent water areas and comprehensive monitoring of changes in the Arctic tundra vegetation cover of transitional zones in the context of climate change; study of the historical and cultural heritage of the National Park “Russian Arctic” and the study of the human body adaptation mechanisms to the high-latitude Arctic.

The expedition was attended by 58 people from 8 countries: Russia, Switzerland, France, Nigeria, Italy, Germany, China and Canada. It is the students and staff of NARFU named after M.V. Lomonosov, Moscow State University named after M. V. Lomonosov, St. Petersburg State University, as well as the employees representing the Federal state budgetary institution “Severnoe

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UGMS”, SSC “Arctic and Antarctic research Institute”, Volgograd State University, Novosibirsk State University, the RAS Institute of Geography, the National Park “Russian Arctic”, the University of Geneva, the University of Lausanne, and the Federal Polytechnic school of Lausanne.

The expedition “AFU-2018” passed 3 800 nautical miles across the White, Barents, Kara and Pechora Seas; its participants visited 2 Arctic archipelagos: the Solovetsky Islands and Novaya Zemlya.

The expedition was called “Terra Novae” and included three stages. First, marine studies were carried out in the White and Barents Seas. A total of 48 stops were made. Deep sensing was carried out at each hydrological station. The sensors fixed pH and alkalinity levels. Rosetta with bathometers was lowered by a maximum of 285 meters, determining, among the other things, the presence of microplastics in the water. Three hydrological sections were made in the White Sea and one in the Barents Sea. Preliminary data helped the researchers to draw conclusions about the strong contamination of the Barents Sea. Also, at the first stage, samples of phyto- and zooplankton were selected to study the content of eco-toxicants.

At the second stage, marine research in the Barents Sea was continued and land works were started. E.g., three land teams were working in the Russkaya Harbor to collect geological and biological samples and “marine garbage”. The latter group was studying how the garbage accumulated on the shores of the Novaya Zemlya.

The third stage included work on hydrological sections in the Kara Sea and monitoring of ice. The NArFU staff and students were monitoring the ice, quickly assessing the physical characteristics of ice total concentration, the presence of ice of different age, crush of ice. Such works are necessary for the data bank for observations of the ice fields movement and drift. In future, these materials will be used to develop recommendations on the shipping along the Northern Sea Route.

During the expedition, the researchers made seven landings on the Arctic archipelagos of Novaya Zemlya and Solovetsky. Soil samples were taken, atmosphere, water, marine biology, flora and fauna of the area were studied.

NArFU scientists continued research started in 2017 as part of a mega-grant. The aim was to develop a methodology for monitoring, evaluating, forecasting and preventing the risks associated with the transfer of highly toxic pollutants along biological pathways, e.g. commercial fish and birds. Pollutants get into food chains and spread in the Arctic ecosystems. On the islands of the Novaya Zemlya Archipelago, employees of the NArFU Laboratory of Ecological Biomonitoring selected samples, incl. soil, bird eggs, liver and fish fillets (cod and haddock), freshwater and bottom sediments, zoo- and phytoplankton, for the subsequent metagenomic analysis and determination of eco-toxicants concentrations in the food chains. On the Kolguev Island, scientists could get blood samples of the local populations. People we also asked to fill in questionnaires about their health.

Oceanographic studies were made in 7 oceanographic sections in the White, Barents and Kara Seas. 58 stations were worked out. Samples were taken to determine the thermohaline char-

acteristics of water for the further study of the Atlantic water masses transformation in the western sector of the Russian Arctic.

Hydrobiological research made by the NArFU staff is based on 30 selected samples of zoo- and phytoplankton for subsequent analysis in the Laboratory of the NArFU Center for Arctic Bio-monitoring.

Within the framework of soil-ecological research, scientists from the Institute of Geography of the Russian Academy of Sciences and the Moscow State University named after M.V. Lomonosov laid 14 soil sections and described 28 horizons of soil profiles; 112 samples were taken for physical, chemical and microbiological analyzes in the laboratory. The most northern endolithic soil-like bodies (endolites) in Russia and Eurasia, representing a specific complex of microbial associations hidden inside the rocks, were found at Cape Zhelaniya.

Geologists from the Novosibirsk State University continued the research by the team of the Laboratory of Geodynamics and Paleomagnetism of the Central and Eastern Arctic during the expeditions "APU — 2016" and "APU — 2017", as well as previous expeditions of 2014 and 2015 [1–7]. Scientists from the NSU took 113 oriented samples for paleomagnetic studies. The results will be used in reconstructions of the crustal blocks drift during the formation of the modern structure of the Arctic margin of Eurasia.

In the framework of terrestrial biological research and the study of terrestrial microfauna of the Arctic archipelago, samples were collected for taxonomic analysis of the fauna of the sedge moor of the Island of the Novaya Zemlya Archipelago. For the first time, insects were collected from aquatic and coastal biotopes of freshwater bodies and watercourses (puddles, lakes, streams, and rivers) of the Novaya Zemlya along the coast of the Kara Sea (near the Bay of Blagopoluchiya and Ledyanaya Harbor). For the first time, a massive material was obtained from adult larvae of two-winged insects (mosquitoes and flies) from their larvae and pupae, which develop in the main freshwater and coastal (semi-aquatic) biotopes of the North of New Earth. In the future, this material will allow us to accurately determine the species composition of dipterans undergoing development in the corresponding biotopes. For the first time, communities and the composition of the invertebrate's population (mostly dipterans) were studied in semi-aquatic biotopes in 4 districts of northern Novaya Zemlya (the environs of Russkaya Harbor, Cape Zhelaniya, Bay of Blagopoluchiya and Ledyanay Harbor). Data was collected to study the fauna and insect communities of sphagnum-sedge moor near Cape Kanin Nos. It was obtained for the moors of the tundra in the western part of the European territory of Russia for the first time.

In 2018, for the first time, The APU expedition completed a research of microplastic distribution. Scientists practiced the methodology of sampling and analysis. Samples were taken at 15 stations, 12 of them have been processed by now. Under the microscope, 1 009 particles less than 5 mm were identified. According to preliminary results, we can say that the Barents sea is the most polluted with microplastic, and the least polluted one is the Kara sea.

Studies of marine microfauna are of a particular interest: scientists collected mollusks to use them as a model group to study the genetic diversity of the fauna in the Barents Sea and neighboring areas. Samples were taken from the fjords and bays along the Northern coast of the Novaya Zemlya Archipelago. Studies of the Barents Sea marine microfauna will provide a better understanding of the history of its settlement.

Another area for research onboard Professor Molchanov was the anthropogenic impact on the NSR ecosystem. Samples of fuel and solid particles (17 in total) from 6 fuel-using installations. These elements are carried by exhaust gases through chimneys to the environment. Information on the structure and operation of the mechanisms and units of the research vessel's power plant was also collected.

The study contributes to a better understanding of the soot formation in the combustion chambers of auxiliary boilers and internal combustion engines of ships, to assess the quantitative and elemental composition, shape and size of emitted particles, shape and dimensions of the selected particles, to clarify the coefficients for calculating emissions of fine PM2.5 particles

During the landings, 35 snow samples were collected to determine organic compounds and metals using the ICP-MS method, black carbon and dust. 10 air sorption tubes were obtained to determine volatile and semi-volatile components.

As it was noted by the head of the expedition, NARFU Vice-rector for International Cooperation Konstantin S. Zaykov, the results of the "Arctic floating University — 2018" not only continued the scientific work of the past years, but also opened up new research horizons for the study of the Western sector of the Arctic. In addition, the expeditions of the Arctic floating University are undoubtedly an innovative type of education in the context of modernization of the higher education.



Fig. 1. NARFU staff at Cape Zhelaniya.



Fig. 2. The employee of the Lab for the Arctic Biomonitoring Anna Trophimova collects samples of zoo- and phytoplankton.



Fig. 3. Students onboard of "Professor Molchanov".



Fig. 4. Botanists' field work in Harbor Russkaya.



Fig. 5. Geologists at the Cape Opasniy.

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SUMMARY

Authors, titles, abstracts, and keywords

SOCIAL AND ECONOMIC DEVELOPMENT

ВРОКБЕРГ У. Туризм в субарктическом и балтийском регионах Европы

WRÅKBERG U. Tourism in the Subarctic and the Baltic Sea regions of Europe

Аннотация. В статье автор утверждает, что культурные измерения Арктики и Субарктики могут быть во многом интересны для современного туризма в качестве новых туристических направлений, важной составляющей исследований в области туризма, а также подготовки управленческих кадров. В Норвегии Евроарктический регион представляется туристам с акцентом на дикую природу. Используется ограниченный набор брендовых элементов: северное сияние, ледяные отели, катание на собачьих упряжках, «сафари» для наблюдения китов или редких птиц, а также для ловли крабов. Дикая природа, как и погода, ненадежна, а разочарованные туристы вредны для бизнеса, поэтому культурное содержание туристических маршрутов оказалось практически необходимым, чтобы разнообразить рассказы гида и выступать в качестве «резервного развлечения» при плохой погоде. В плане этнологического и исторического наследия Евроарктический регион потенциально интересен с точки зрения развития регионального туризма. Настоящая статья посвящена сравнительному анализу туризма в Евроарктическом регионе и юго-восточном регионе Балтийского моря с целью поиска интересных решений и их практического применения.

Ключевые слова: *Норвегия, Россия, субарктический туризм, культурное наследие, коллективная память, пограничье, Куршская коса, Клайпеда.*

Abstract. It is argued that the cultural dimensions of the Arctic and Subarctic have much to offer contemporary tourism, both as sources of new contents in tours and as an important field in tourism research and management training. In Norway, the Euroarctic is marketed to tourists focusing on nature and wildlife. A limited set of branding elements is used: northern lights, ice hotels, dogsledding, “safaris” for watching: whales, rare birds, and for catching king crabs. Wildlife, like the weather, is unreliable, and disappointed tourists are bad for business, so cultural contents have in practice proved necessary to bring into guide narratives as “backup entertainment” on no-shows of the natural attraction. Much more of the ethnological and historic heritage of the Euroarctic has potential interest to regional tourism development. This article compares tourism in the Euroarctic with that of the southeast Baltic Sea region, to find examples of what this could be and makes some recommendations based on that.

Keywords: *Norway, Russia, subarctic tourism, cultural heritage, collective memory, borderland, Curonian Spit, Klaipeda.*

ГРУШЕНКО Э.Б. Экологический туризм как фактор устойчивого развития Западной Арктики

GRUSHENKO E.B. Ecological tourism as a factor of sustainable development of the Western Arctic

Аннотация. В статье экспертной оценкой обосновывается роль экологического туризма как наиболее приоритетного и конкурентоспособного вида рекреационного природопользования в Западной Арктике. Разработаны теоретические положения и определено значение туристской отрасли в устойчивом развитии российской Арктики на основе анализа проблем и перспектив современного развития экологических видов туризма в его регионах и центрах. Показана специфика организации туризма с учётом возросшего интереса к арктическим регионам, роста объёмов круизного туризма и увеличения антропогенной нагрузки на полярные ландшафты. Сформулированы практические предложения и определены первоочередные стратегические задачи по развитию арктического туризма: минимизация антропогенного воздействия на природную среду и сохранение объектов культурного и природного наследия Арктики, повышение доступности арктических территорий для туристов. Развитие конкуренции в сфере транспорта, упрощение логистики, сочетание морских круизов с авиатуризмом позволит удешевить поездку для желающих посетить уникальные высокоширотные арктические территории и увеличить туристский поток. Вследствие преобладания нишевых дорогостоящих видов туризма в Арктике необходима поддержка малозатратных и высокодоходных направлений туризма. Инновационные инвестиционные проекты в сфере арктического туризма на основе кластеров должны привлечь в регион туристов, что приведёт к дополнительным инвестициям в модернизацию инфраструктуры.

Ключевые слова: *Западная Арктика, арктический туризм, высокоширотные архипелаги, туризм, экологический туризм, устойчивое развитие, национальный парк «Русская Арктика», Мурманская область.*

ИВАНОВА Л.В., ПЕРЕИН В.Н., ХАРИТОНОВА Г.Н. Проблемы формирования проекта минерально-сырьевого центра в Кольской опорной зоне АЗРФ
IVANOVA L.V., PEREIN V.N., KHARITONOVA G.N. Challenges of making the project of mineral resource center in the Kola support zone of the Russian Arctic: challenges and solutions

Аннотация. В статье выполнен анализ управленческой инновации правительства страны по формированию нового вида территориального управления арктическим макрорегионом — опорных зон развития. Сделан обзор разрабатываемых и планируемых к освоению месторождений полезных ископаемых в границах Кольской опорной зоны и инвестиционных про-

Abstract. The article is based on the expert assessment of ecological tourism as the priority and competitive type of recreational nature management in the Western Arctic. The theoretical provisions are developed and the importance of the tourism industry in the sustainable development of the Russian Arctic is determined based on the analysis of problems and prospects of the modern development of ecological types of tourism in the regions and centers of tourism. The specificity of tourism is discussed considering the increased interest in the Arctic, the growth of cruise tourism and the increase in the anthropogenic load on the polar landscapes. Proposals are given and priority strategic tasks for the development of Arctic tourism are formulated: minimization of anthropogenic impact on the environment and preservation of the cultural and natural heritage of the Arctic, increasing the availability of Arctic territories for tourists. Development of competition in the field of transport, simplification of logistics, the combination of sea cruises with air travel to reduce the cost of travel for those wishing to visit the unique high-latitude Arctic territories and increase the tourist flow. Due to the predominance of expensive types of tourism in the Arctic, support for low-cost and high-income tourism destinations is needed. Innovative investment projects in the field of the Arctic tourism based on clusters could attract tourists and additional investments in infrastructure modernization.

Keywords: *Western Arctic, Arctic tourism, high-latitude archipelagos, tourism, eco-tourism, sustainable development, the national park "Russian Arctic", the Murmansk region.*

Abstract. The article analyzes the managerial innovation of the Russian government on a new type of territorial management of the Arctic macroregion - support zones of development. The authors present an overview of the mineral deposits developed and planned for development within the boundaries of the Kola Peninsula and investment projects of the largest mining companies of the

ектов крупнейших горнопромышленных компаний Мурманской области. Особое внимание уделено месторождениям стратегических и дефицитных полезных ископаемых. Предложены методические подходы к принятию управленческих решений по выбору наиболее результативных проектов для реализации целей социально-экономического развития и обеспечения экологической безопасности арктического региона с учётом глобальных изменений климата. На основе анализа положений законопроекта федерального закона «Об арктической зоне Российской Федерации» сделан вывод о низкой вероятности включения минерально-сырьевого центра Мурманской области в пилотный проект в период с 2018 г. по 2020 г. Обосновываются предложения по гармонизации требований к оформлению заявок арктического субъекта федерации по формированию минерально-сырьевого центра Кольской опорной зоны с методикой разработки инвестиционных проектов и процедурами их государственной комплексной и экологической экспертиз, а также сделаны предложения для повышения эффективности деятельности заявителей и участников опорной зоны.

Ключевые слова: *Кольская опорная зона развития, минерально-сырьевой центр, пилотный проект.*

НЕНАШЕВА М.В., ОЛСЕН Ю.О. Водный транспорт Европейского Севера России: социальная значимость, проблемы и перспективы развития

NENASHEVA M.V., OLSEN J.O. Water transport in the European North of Russia: social significance, challenges and perspectives of development

Аннотация. Статья посвящена анализу внутреннего водного транспорта Европейского Севера России. На примере Архангельской области рассмотрена краткая история, современное состояние, основные проблемы и перспективы развития речного судоходства. Показано, что исторически внутренний водный транспорт играл важную роль в экономическом и социальном развитии Архангельской области и долгое время занимал лидирующую позицию в транспортной системе региона. Однако в 90-е гг. XX в. в связи с переходом к рыночной экономике реч-

Мурманск region and, above all, the project “Kola Chemical and Technological Cluster” in accordance with the requirements developed by the federal regulator for forming mineral resource centers in support zones of development in the Arctic. Particular attention is paid to the deposits of strategic and scarce minerals attractive for private investors. They will not require significant expenditures from regional authorities and local self-governments for development activities or any other methods of the state support and are socially significant for the region. The authors also discuss methodical approaches to management decisions when selecting the most efficient projects for implementing, the goals of socio-economic development and ensuring the ecological safety in the Arctic region under the global climate changes. Basing on the draft federal law “On the Arctic zone of the Russian Federation”, it was concluded that the mineral resource center of the Murmansk region was not likely to be included in the pilot project in 2018 - 2020 to form the Kola support zone of development in the Arctic. Proposals on harmonizing the requirements for registering applications of the Russian Arctic regions for forming the mineral resource center of the Kola support zone with the order on inclusion of mineral reserves in the state balance list. The authors justified methodology for developing investment projects and the procedures for their state comprehensive and environmental assessments. Some proposals for enhancing the efficiency of activities of applicants and participants in the support zone are made.

Keywords: *the Kola support zone of development, mineral resource center, pilot project.*

Abstract. This article is devoted to the analysis of the water transport in the European North of Russia. Using the case of the Arkhangelsk Oblast, we present the main challenges and perspectives of river navigation development in light of the area’s history and current situation. Our research shows that, historically, water transport has played an important role in the social and economic development of the Arkhangelsk Oblast and held a leading position in the transportation system. However, due to the transition to a market economy in the 1990s, river traffic lost its competitive ad-

ное судоходство стало терять конкурентные преимущества. В исследовании приведены статистические данные, показывающие отрицательную динамику пассажирских перевозок внутренним водным транспортом. Отсутствие государственного управления отраслью привело к ухудшению качественного состояния речного транспорта и его инфраструктуры. Несмотря на существующие проблемы, внутренний водный транспорт по-прежнему играет важную роль в социальном развитии территорий Европейского Севера России. В последние годы на различных уровнях власти обсуждаются вопросы возрождения объёмов речных перевозок и повышения их эффективности для развития Архангельской области. В статье рассматриваются перспективы преодоления сложившихся негативных тенденций развития внутреннего водного транспорта в связи с промышленным освоением Арктики и использованием культурного потенциала области.

Ключевые слова: *внутренний водный транспорт, речное судоходство, социальная значимость, Архангельская область, Европейский Север.*

САУНАВААРА Ю. Арктические подводные коммуникационные кабели и региональное развитие северных территорий

SAUNAVAARA J. Arctic subsea communication cables and the regional development of northern peripheries

Аннотация. Ещё несколько лет назад Северный Ледовитый океан считался последним океаном, в котором отсутствуют подводные кабели для передачи данных. На сегодняшний день ситуация начала меняться. Предполагается, что одним из наиболее важных путей увеличения глобальной передачи данных будет установление трафика между Азией и Европой, а Северный Ледовитый океан станет связующим звеном и сделает кабельные соединения короче и быстрее. В настоящей статье представлен анализ политики регионального развития о. Хоккайдо и Северной Финляндии в свете недавних проектов кабельных подводных коммуникаций («Quintillion» и «Arctic Connect»), направленных на создание коммуникационной среды между Восточной Азией и Европой. Основным выводом стало предположение о том, что улучшение международной коммуникационной сети при помощи подводных кабелей приведёт к развитию информационных отраслей в этом регионе, особенно в Финляндии. Во многом это связано с отсутствием осведомлённости об этих проектах региональных акторов на о. Хок-

vantages. The study presents statistical data showing the negative trends of the passenger inland water transport development. The lack of the state involvement in industrial management has led to the deterioration of the water transport quality and its infrastructure. Despite existing challenges, however, water transport still plays an important role in the socio-economic development of the Russian North. In recent years, various levels of government have discussed the revival of the river navigation and improvements in its use for regional development. The article discusses prospects for overcoming the existing negative trends in the development of water transport. The focus is made on its connection with the industrial development of the Arctic and the cultural potential of the region.

Keywords: *inland water transport, river navigation, social significance, the Arkhangelsk Oblast, European North.*

Abstract. Some years ago, the Arctic Ocean was still described as one of the last oceans that did not have subsea communications cables across it. This situation is now changing. One of the greatest increases in global data transfer is predicted to be traffic between Asia and Europe, and the Arctic Ocean offers a shortcut, making physical cable connections shorter and decreasing latency. Recent developments regarding two ongoing subsea communications cable projects (Quintillion and Arctic Connect), which aim to connect East Asia and Europe, are discussed, and the connection between these projects and regional development policies in Hokkaido and northern Finland are analysed. It is shown that the proposition that improved international connectivity through subsea communications cables could bring information-intensive industries into the region had been stronger in Finland. This is largely due to a lack of information and awareness concerning these projects among the regional actors in Hokkaido; however, no concrete policy or funding instrument has been developed in either of the case regions.

кайдо. Однако какие-либо политические инструменты и нюансы финансирования до сих пор не были проработаны ни в одном из упомянутых регионов.

Ключевые слова: Арктика, подводный кабель для передачи данных, связь, региональное развитие, Хоккайдо, Северная Финляндия.

Keywords: Arctic, subsea data cable, connectivity, regional development, Hokkaido, northern Finland.

POLITICAL PROCESSES AND INSTITUTIONS

ЕЛЕЦКИЙ Н.Д. Интересы России в условиях глобализации отношений собственности и управления (на примере Арктического региона)

ELETSKY N.D. Property and government interests of Russia under globalization: the Arctic case

Аннотация. Современные процессы формирования глобальной собственности и управления противоречиво сочетаются с сохранением и воспроизводством экономических взаимодействий в рамках отдельных государств, регионов и межгосударственных отношений. Актуализация этих процессов в Арктическом регионе обусловлена его превращением в место фокусировки и наиболее острого проявления новых форм противоречий между глобализацией и национально-государственными интересами. Автор приходит к выводу, что реализация российской арктической стратегии усложняется неопределённостью перспектив и вариантностью возможных векторов развития неоглобализации. В статье обосновывается необходимость принятия кардинальных мер по укреплению российских позиций в Арктике в условиях современного усиления тенденций регионализации и фрагментации мирового хозяйства. Геоэкономическая и геополитическая конфигурация международных взаимодействий в Арктике может в ближайшее время измениться вследствие перехода от однополярной к многополярной модели мироустройства и нарастания угроз новой гибридной холодной войны. Показано, что противоречия между арктическими державами обостряются на фоне стремления неарктических стран участвовать в эксплуатации ресурсов региона. Автор выявляет задачи поиска оптимального соотношения между объективными императивами глобализации и защитой национально-государственных и региональных интересов России как крупнейшей арктической державы.

Ключевые слова: глобализация собственности, глобальное управление, глобальные противоречия, глобальная политическая экономия, кризис глобализма, многополярность, регионализация, глокализация, Арктика, ресурсы Арктики, Северный морской путь, интересы России.

Abstract. Modern processes of the global property and governance formation are contradictory combined with the preservation and reproduction of economic interactions within the framework of individual States, regions and inter-state relations. The actualization of these processes in the Arctic region is due to its transformation into a place of focus and the most acute manifestation of the new contradictions between globalization and nation – state interests. The author concluded that the implementation of the Russian Arctic strategy is complicated by the uncertainty of prospects and the variation of possible vectors of the new globalization. The article substantiates the need for drastic measures to strengthen the Russian position in the Arctic due to the current strengthening of regionalization and fragmentation of the world economy. The geo-economic and geopolitical configuration of international cooperation in the Arctic may change in the near future due to the transition from of a unipolar to a multipolar model of the world order and the growing threats of a new hybrid cold war. It's shown that the contradictions between the Arctic powers are complicated against the background of the desire of the non-Arctic countries to participate in the exploitation of the region's resources. The author reveals the issues related to the search of the optimal balance between the objective imperatives of globalization and the protection of nation – state and regional interests of Russia as the largest Arctic power.

Keywords: globalization of property, global governance, global contradictions, global political economy, crisis of globalism, multipolarity, regionalization, glocalization, the Arctic, the Arctic resources, the Northern Sea Route, interests of Russia.

NORTHERN AND ARCTIC SOCIETIES

МИХАЙЛОВА Г.В. Арктический социум в условиях изменений состояния природной среды и климата (по результатам опросов населения)

MIKHAYLOVA G.V. The Arctic society under the environmental and climate change (based on survey results)

Аннотация. Изменения состояния природной среды и климата имеют различные локальные последствия на территориях постоянного проживания людей в Арктике. В статье представлены результаты изучения влияния этих изменений на традиционное природопользование в восприятии жителей Ненецкого автономного округа. Используются материалы девяти фокус-групп жителей округа, дополненные экспертными интервью, которые проводились в 2014 г., 2015 г., 2017 г. в городе Нарьян-Мар и в двух сельских поселениях на острове Колгуев и на полуострове Канин. В числе причин, негативно влияющих на оленеводство, жителями были названы: изменения растительного покрова тундр и популяций животных и птиц, в них обитающих, изменение пищевого рациона оленей, ухудшение доступности подснежных кормов, нерациональное использование оленьих пастбищ, загрязнение тундровых территорий промышленным мусором, отходами. Охотниками отмечается сокращение периода охоты весной и ухудшение доступности охотничьих ресурсов, уменьшение численности гусей (гуменника, белолобого гуся), смещение путей их пролета из-за изменения ледового режима, увеличение популяции белошеюй казарки. Для рыболовства характерно сокращение численности ценных пород рыб, появление и распространение горбуши, что связывается населением с загрязнением и обмелением водоемов, повышением температуры воды, а также с избыточной ловлей рыб. Изменения климата положительно влияют на разнообразие и продуктивность дикорастущих ресурсов, однако интенсивный сбор ухудшает состояние ягодников. Отмечается снижение качества традиционно используемых населением природных ресурсов, что повышает степень дискомфорта жизни на удаленных территориях Арктики.

Ключевые слова: Арктическая зона РФ, мнение населения, традиционное природопользование, состояние природной среды, изменение климата, природные ресурсы.

Abstract. Changes of the environment and climate have different local consequences in the Arctic. The article presents the research results of these impacts on traditional nature management in the perception of residents of the Nenets Autonomous District. The materials of nine focus groups and expert interviews were conducted in 2014, 2015, 2017 in the town of Naryan-Mar and two rural settlements on the island of Kolguev and Kanin Peninsula. The author reveals some reasons for the negative impact on reindeer herd-ing: changes in the vegetation cover of tundra and populations of animals and the birds there; changes in the diet of deer; deterioration of accessibility of snow-covered forages; irrational use of deer pastures; pollution of tundra by industrial debris and waste. Hunters noted a reduction in the period of the spring hunting, deterioration in the availability of hunting resources, a decrease in the number of geese and a shift in their migration routes due to changes in the ice regime. A reduction in the number of valuable fish species is typical for fisheries. It is associated with contamination and shallowing of water bodies, an increase in water temperature and excessive fish production. Climate change positively influences the diversity and productivity of wild resources, but intensive harvesting worsens the condition of the berry. A decrease in the quality of the natural resources traditionally used by the population was observed. It increases the degree of discomfort in the remote territories of the Arctic.

Keywords: the Arctic zone of the Russian Federation, public opinion, traditional nature management, the state of the natural environment, climate change, natural resources.

CONSERVATION OF THE CULTURAL AND NATURAL ENVIRONMENT OF THE ARCTIC

БОРОВИЧЕВ Е.А., ПЕТРОВ В.Н., ПЕТРОВА О.В., КОРОЛЕВА Н.Е. Сеть ООПТ Мурманской области: вчера, сегодня, завтра

BOROVICHEV E.A., PETROV V.N., PETROVA O.V., KOROLEVA N.E. Protected areas network in the Murmansk Region: yesterday, today, and tomorrow

Аннотация. В результате анализа исторической ретроспективы территориальной охраны природы в Мурманской области выделены и охарактеризованы шесть этапов её развития: от первых заповедников до сегодняшнего дня. В настоящее время сеть ООПТ Мурманской области включает в себя три заповедника, один национальный и два природных парка, 12 заказников, 55 памятников природы и территорию Полярно-альпийского ботанического сада-института им. Н.А. Аврорина КНЦ РАН. Общая площадь ООПТ в области 1 947 799,4 га или 13,4% от площади региона. Оценка эффективности ООПТ региона на основе соответствия режимов охраны имеющимся для территорий угрозам показала, что эффективно выполнять поставленные природоохранные задачи могут в основном заповедники и национальный парк, чья общая площадь составляет всего 4,2% от площади региона. Недостаточная нацеленность правового и управленческого регулирования территориальной охраной природы на построение целостной системы ООПТ негативно влияет на пути её развития. При реализуемом подходе, даже при достижении намеченной доли ООПТ в 16,4% от площади области, представляется сомнительным обеспечение сохранения биоразнообразия и устойчивости экосистем региона.

Ключевые слова: ООПТ, редкие виды, охрана природы, Мурманская область.

ИВАНОВА Л.В., СОКОЛОВ К.М., ХАРИТОНОВА Г.Н. Тенденции загрязнения пластиком акваторий и побережья Баренцева моря и сопредельных вод в условиях изменения климата

IVANOVA L.V., SOKOLOV K.M., KHARITONOVA G.N. Plastic pollution tendencies in the Barents Sea and adjacent waters under the climate change

Аннотация. На основе обзора зарубежных и российских исследований представлена характеристика загрязнения пластиком акваторий и побережья Баренцева моря и сопредельных вод с учётом влияния различных факторов, включая изменение климата в арктическом районе Северного Ледовитого океана (СЛО). В первом приближении выполнена оценка степени угрозы различным видам морехозяйственной деятельности и морской экосистеме от загрязнения пластиком. Акцент сделан на существующем и возможном ущербе для промышленного рыболовства, осуществляемого в Баренцевом море и в сопредельных водах. Проведён анализ норма-

Abstract. The article represents a retrospective of nature conservation in the Murmansk Region. It is devoted to the period since the first State Nature Reserves to the present day. Today, the network of Protected Areas (PA) in the Murmansk Region consists of three nature state Reserves, one National Park, two natural parks, 12 protected areas "Zakaznik", 55 nature monuments and the protected area of the Polar-Alpine Botanical Garden-Institute. The total area of the PA is 1,947,799.4 hectares or 13.4% of the Murmansk Region. An effectiveness of the PA was assessed due to the correspondence of the protection regimes and the threats. The authors concluded that effective environmental protection could be realized only in small part of PA, mainly in nature state reserves and national park, whose total area is only 4.2% of the Murmansk Region. At the present level of efficiency, even if it will be possible to achieve a share of Pas equal to 16.4% of the region's area, it is hardly possible to guarantee the proper level of biodiversity conservation and the stability of the ecosystem of the region.

Keywords: protected areas, rare species, nature conservation, the Murmansk Region.

Abstract. The article represents the analysis of the plastic pollution of water areas and coasts of the Barents Sea and adjacent waters based on foreign and Russian studies. The authors consider the influence of various factors, including climate change in the Arctic. The threat to various types of marine activities and the marine ecosystem from plastic pollution is evaluated. The emphasis is on the existing and potential damage to industrial fisheries in the Barents Sea and adjacent waters. An analysis of the regulatory and organizational and economic mechanisms for preventing plastic pollution of the Arctic seas and coasts of the Arctic Council member states and practices of their application is carried out. Par-

тивно-правового и организационно-экономического механизмов предотвращения загрязнения пластиком арктических морей и побережий в странах Арктического Совета и практик его применения. Особое внимание уделено проблеме контроля и надзора за сбором мусора на судах и эффективности механизма утилизации мусора, доставляемого судами в порты. Для совершенствования нормативно-правового регулирования проблемы обращения с отходами производства и потребления обосновывается целесообразность принятия проекта Федерального закона «О вторичных материальных ресурсах»; создания в стране финансовой платформы циркулярной экономики по аналогии с Европейским Союзом и первоочередной разработки технологий по увеличению жизненного цикла товаров из пластика и по их повторному использованию. В качестве дополнения в мероприятия Государственной программы социально-экономического развития Арктики до 2025 года и государственных программ социально-экономического развития арктических субъектов федерации предлагается включить различные виды пластика в перечень опасных загрязнителей акватории и побережий российской Арктики; в арктических субъектах федерации создавать производства по переработке пластиковых отходов рыбодобывающих предприятий; региональным властям поддерживать волонтерскую деятельность по очистке побережий Баренцева моря от мусора, в том числе и пластикового.

Ключевые слова: Баренцево море, пластик, загрязнение, изменение климата, морехозяйственная деятельность, экологический и экономический ущерб, циркулярная экономика.

ticular attention is paid to the control and supervision over litter collection onboard and the efficiency of its disposal after delivery to the land. To improve the legal regulation of handling waste of production and consumption, it is justified to adopt the draft federal law “On secondary material resources”; to create a financial platform for the circular economy in analogy with the European Union and to develop technologies to increase the life cycle and reuse of goods made of plastic. To supplement to the activities of the State Program for social and economic development of the Arctic until 2025 and the State Programs for social and economic development of the Arctic, it is proposed to include various types of plastic in the list of hazardous pollutants of water areas and coasts of the Russian Arctic and to build facilities for processing of plastic wastes from fishing enterprises in the Arctic. Also, the regional authorities should encourage volunteering for cleaning coasts of the Barents Sea from garbage, incl. plastic.

Keywords: The Barents Sea, plastic pollution, climate change, maritime activities, ecological and economic damage, circular economy.

REVIEWS AND REPORTS

АВДОНИНА Н.С. «Арктический плавучий университет» совершил экспедицию вокруг Новой Земли
AVDONINA N.S. The Arctic Floating University completed the expedition around Novaya Zemlya

Аннотация. Данный материал представляет обзор экспедиции «Арктический плавучий университет — 2018», тематическое название которой «Terrae Novae». Участники экспедиции прошли 3 800 морских миль по Белому, Баренцеву, Карскому и Печорскому морям, посетив 2 арктических архипелага: Соловецкие острова и Новую Землю. Экспедиция проходила в три этапа. На первом этапе были проведены морские исследования в Белом и Баренцевом морях. В общей сложности было сделано 48 остановок. На каждой гидрологической станции было проведено глубинное зондирование. На втором эта-

Abstract. The article presents a review of the expedition “Arctic Floating University — 2018”, the thematic name of which was “Terrae Novae”. The expedition passed through 3,800 nautical miles along the White, Barents, Kara and Pechora Seas. Its participants completed landings on two arctic archipelagos: Solovetsky Islands and Novaya Zemlya. The expedition had three stages. At the first stage, marine research was made in the White and Barents seas. In total, 48 stops were made, and deep sounding was carried out at each hydrological station. At the second stage, marine and ground research was made in the Barents Sea. The third stage included

пе продолжены морские исследования в Баренцевом море и начаты наземные работы. Третий этап включал работу на гидрологических разрезах в Карском море и мониторинг ледовой обстановки. За время экспедиции исследователи сделали семь высадок на арктических архипелагах Новой Земли и о. Соловецкого. Были взяты образцы почв, проведены исследования атмосферы, воды, морской биологии, флоры и фауны региона. Планируется получение новых данных по разработке методологии мониторинга, оценки прогнозирования и предупреждения рисков, связанных с переносом биологическими путями высокотоксичных загрязняющих веществ, способных накапливаться в пищевых цепях и распространяться в арктических экосистемах; по изучению эндолитов, проведению палеомагнитных исследований; микропластика; морской микрофауны с целью понимания истории заселения Баренцева моря и др.

Ключевые слова: «Арктический плавучий университет», Новая Земля, морские исследования, палеомагнитные исследования, мониторинг экосистемы, микропластик, почвенно-экологические исследования, морская микрофауна, антропогенное воздействие.

work on hydrological sections in the Kara Sea and ice condition monitoring along the area. The expedition research team made seven landings on the Arctic archipelagos of Novaya Zemlya and Solovetsky. Samples of soil were taken, and specific studies of the atmosphere, water, marine biology, flora and fauna of the area were carried out. The obtained materials contain new data on the development of a monitoring methodology, assessment of forecasting and prevention of risks associated with biological transport of highly toxic pollutants that can accumulate in food chains and spread to Arctic ecosystems; the study of endoliths; paleomagnetic studies; microplastic studies; marine microfauna for investigating the settling history of the Barents Sea, and etc.

Keywords: *The "Arctic floating university", Novaya Zemlya, marine research, paleomagnetic studies, ecosystem monitoring, microplastic, soil-ecological studies, marine microfauna, anthropogenic impact.*

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