

CONSERVATION OF THE CULTURAL AND NATURAL ENVIRONMENT OF THE ARCTIC

UDC [58:502](470.21)(045)

DOI: 10.17238/issn2221-2698.2018.32.107

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

© **Evgeny A. BOROVICHEV**, Cand. Sci. (Biol.), Leading Researcher

E-mail: borovichyok@mail.ru

Institute of the Industrial Ecology Problems of the North of the Kola Science Center of RAS, Apatity, Russia

© **Viktor N. PETROV**, Deputy Director for protected areas development

E-mail: victor.n.petrov@gmail.com

Administration of regional protected areas of the Murmansk Region, Lovozero, Russia

© **Olga V. PETROVA**, Junior Researcher

E-mail: olechka.v.petrova@gmail.com

Institute of the Industrial Ecology Problems of the North of the Kola Science Center of RAS, Apatity, Russia

© **Natalia E. KOROLEVA**, Cand. Sci. (Biol.), Senior Researcher

E-mail: flora012011@yandex.ru

Polar-Alpine Botanical Garden-Institute of the Kola Science Center of RAS, Kirovsk, Russia

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

* For citation:

Borovichyok E.A., Petrov V.N., Petrova O.V., Koroleva N.E. Protected areas network in the Murmansk Region: yesterday, today, and tomorrow. *Arktika i Sever* [Arctic and North], 2018, no. 32, pp. 88–98. DOI: 10.17238/issn2221-2698.2018.32.107

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 Prikhibin'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.

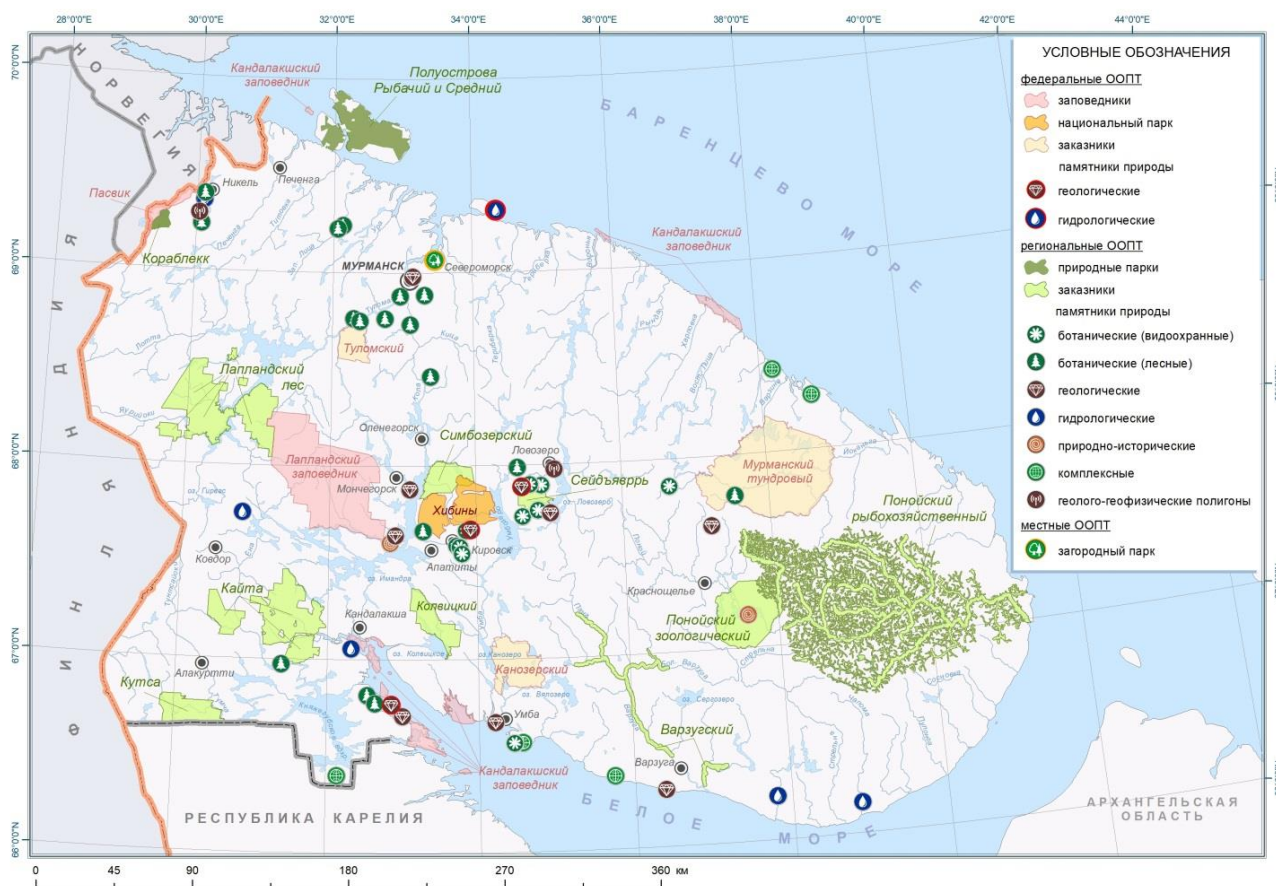


Fig. 1. Current SPNTs of the Murmansk Oblast.

The total area of SPNTs in the Murmansk Oblast is 1,947,799.4 ha or 13.4% of 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 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 rybokhozyaystvenniy" reserves (7,202.3 ha), the "Simbolskiy" 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.

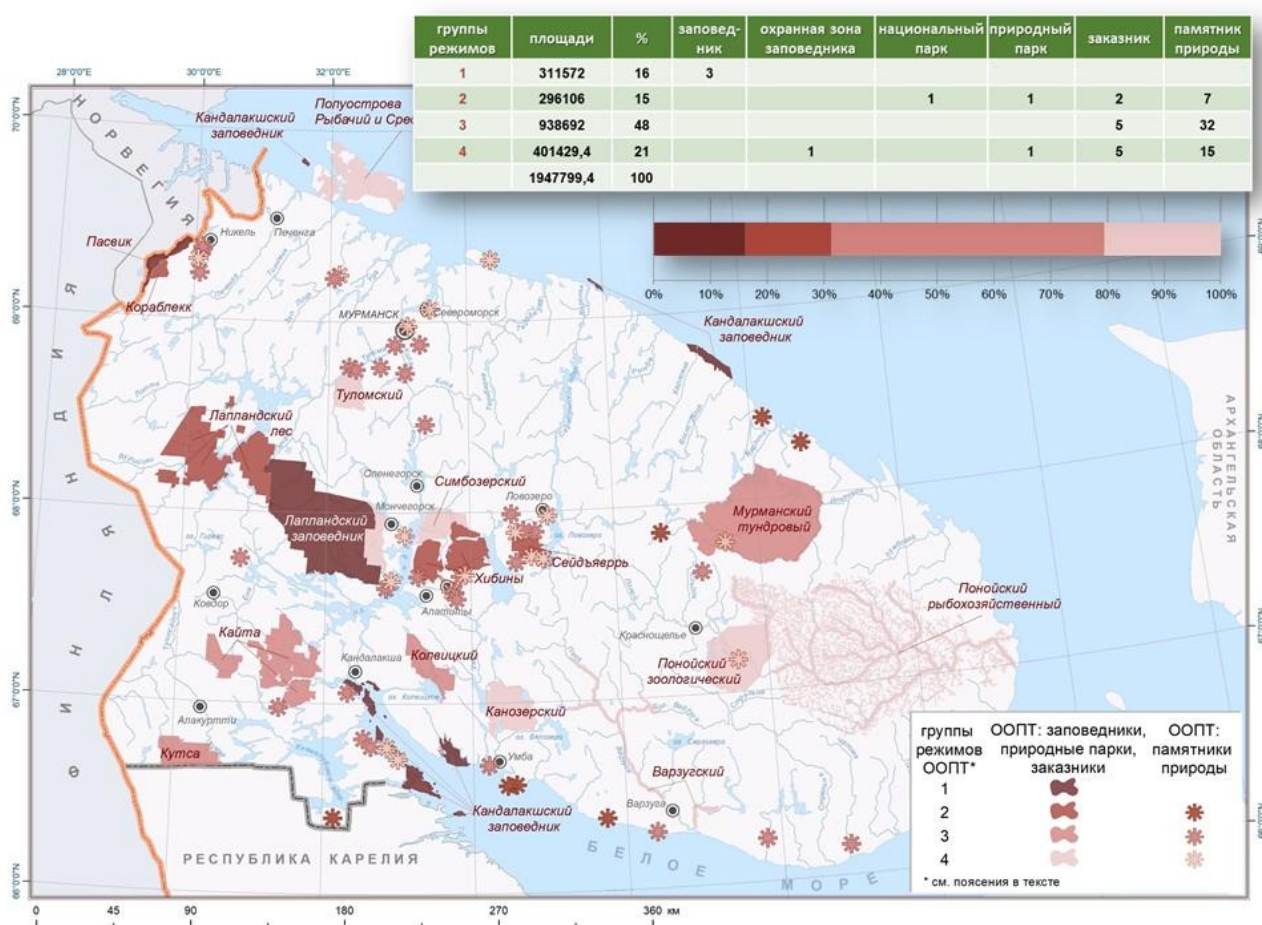


Fig. 2. SPNTs of the Murmansk Oblast related to different groups of protection regimes.

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.

Acknowledgments and funding

The article was prepared within the framework of the state assignments of the FRC KSC RAS (AAAA-A18-118021490070-5 and 114110570120) and with financial support of the Russian Foundation for Basic Research (projects 17-44-510841_R_A and 18-05-60142_Arctic).

References

1. Saura S., Bastin L., Battistella L., Mandrici A., Dubois G. European Protected areas in the world's ecoregions: How well connected are they? *Ecological Indicators*, 2017, vol. 76, pp. 144–158.
2. Joppa L.N., Pfaff A. Global protected area impacts. *Proceedings of the Royal Society B: Biological Sciences*, 2011, vol. 278, pp. 1633–1638.
3. Stishov M.S. Metodika otsenki prirodookhrannoy effektivnosti osobo okhranyaemykh prirodnykh territoriy i ikh regional'nykh sistem [Methodology for assessing the environmental efficiency of protected areas and their regional systems]. Moscow, 2012, 284 p. (In Russ.)

4. Geldmann J., Barnes M., Coad L., Craigie I. Effectiveness of terrestrial protected areas in reducing habitat loss and population declines. *Biological Conservation*, 2013, vol. 161, pp. 230–238.
5. Coetsee B.W.T., Gaston K.J., Chown S.L. Local scale comparisons of biodiversity as a test for global protected area ecological performance: a meta-analysis. *PLoS One*, 2014, vol. 9, no. 8. e105824.
6. Kobayakov K.N., Smirnov D.Yu. Aktual'nye voprosy ispol'zovaniya i okhrany lesov Murmanskoy oblasti [Actual matters of use and protection of forest in Murmansk Province]. Apatity, 2001, 48 p. (In Russ.)
7. Semenov-Tyan-Shanskiy V.P. O tipakh mestnostey, v kotorykh neobkhodimo uchredit' zapovednik tipa amerikanskikh natsional'nykh parkov. Doklad 2 oktyabrya 1917 g. [About landscape types where there is necessary to establish strict protected areas like American national parks/ Report on 2nd October 1917], *Stoletiye Postoyannoy Prirodookhranitel'noy komissii Imperatorskogo Russkogo geograficheskogo obshchestva. Yubileynaya kniga – almanakh [100 years of regular commission on nature protection of Russian Emperor Geographic Society]*, M.: RGO Publ., 2012. (In Russ.)
8. Eykhfel'd I.G. Ekskursionnoe delo i okhrana prirody v Khibinskikh tundrakh [Excursion affair and nature protection in Khibiny Mountains]. *Karelo-Murmanskij kraj*, 1929, no. 10, pp. 9–11.
9. Kreps G.M. Dikiy severnyy olen' na Kol'skom poluostrove i proekt organizatsii Laplandskogo zapovednika [Wild northern reindeer on the Kola Peninsula and project of establishment of the Lapland Reserve]. *Karelo-Murmanskij kraj*, 1928, no. 10–11, pp. 37–40.
10. Kreps G.M. Organizatsiya Laplandskogo zapovednika [Organization of the Lapland Reserve]. *Karelo-Murmanskij kraj*, 1930, no. 2, pp. 31–33. DOI 10.14214/sf.a8382
11. Häyrén E. Pummanginniemi i Petsamo såsom naturskyddsområde. *Silva Fennica*, 1927, no. 3, pp. 1–21. DOI 10.14214/sf.a8384
12. Linkola K. Suunnitelma luonnonsuojelualueiden erottamiseksi Pohjois-Suomen valtionmailla. *Silva Fennica*, 1926, no. 1, pp. 1–44. DOI 10.14214/sf.a8382
13. Merikallio E. Heinäsaarten kansallispuisto ja Pummangin luonnonpuisto. Metsätieteellisen tutkimuslaitoksen luonnonsuojelualuekuvauksia 2. Helsinki, 1939. 24 s.
14. Karpovich V.N. *Kandalakshskiy zapovednik* [Kandalakshsky Reserve]. Murmansk: Murmanskoe knizhnoe izdatel'stvo Publ., 1984, 156 p. (In Russ.)
15. *Osobo okhranyaemye prirodnye territorii Murmanskoy oblasti* [Protected Natural Areas of Murmansk Region]. (Spravochnoe posobie). Izdanie 2. Murmansk, Apatity, 2003. 72 p. (In Russ.)
16. Semenov-Tyan-Shanskiy O.I. Laplandskiy zapovednik. [Lapland Reserve]. *Zapovedniki evropejskoj chasti RSFSR*. I. Moscow, Mysl' Publ., 1988, pp. 60–89. (In Russ.)
17. Kryuchkov V.V., Kondratovich I.I., Andreev G.N. *Krasnaya kniga ekosistem Kol'skogo Severa* [Red Data Book of habitats of the Kola North]. Apatity, KFAN USSR Publ., 1988, 105 p. (In Russ.)
18. *Sokhranenie tsennykh prirodnikh territoriy Severo-Zapada Rossii. Analiz reprezentativnosti seti OOPT Arkhangel'skoy, Vologodskoy, Leningradskoy i Murmanskoy oblastey, Respubliki Karelii, Sankt-Peterburga* [The conservation of value nature territories of the North-West of Russia. Analysis of the representativeness of the SPA network in Arhangel'sk, Vologoda, Leningrad and Murmansk Regions, Karelia Republic and Sankt-Petersburg]. Ed. by Kobayakova K.N. SPb., 2011, 506 p. (In Russ.)
19. *Krasnaya kniga Murmanskoy oblasti* [Red Data Book of Murmansk Region]. Murmansk, Murmanskoe oblastnoe knizhnoe izdatel'stvo Publ., 2003, 400 p. (In Russ.)