Prospects of Development for Urban Areas in the Russian Arctic

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Abstract: The development of the Arctic was an important political and economic topic of the Soviet Union. This urbanization activity declined dramatically in the economic and political chaos of the 1990s, although some positive transformations have been seen in the new millennium. This article examines whether the colonization of the Russian Arctic will follow Soviet-era plans or the region will remain scarcely populated in the near future. The history and methods of urbanization in the Russian Arctic have been analyzed in order to better shed light on this question.

Keywords: Arctic, mining, population decline, Russia, Russian Arctic, urbanization

A tendency to colonize the Arctic is considered as one of the main trends of Russian history (Laruelle 2012), and the development of the Arctic was one of the foremost political and economic topics of the Soviet Union. The special projects for the building of Arctic cities were actively developed during the Soviet period (Filin, Emelina, and Savinov 2018), though in the 1990s the political and economic chaos resulted in a rapid decline of this activity (Blakkisrud and Hønneland 2000; Heleniak 2010; Suutarinen 2013). However, in the new millennium there have been some positive transformations (Rasell 2009), and construction is being carried out even in the most extreme northern territories. In particular, on the islands of the Franz Josef Land Archipelago, the world's northernmost post office operates in one of them, although not intensively. We can see that economic activity in the Arctic has intensified; the building of icebreakers started anew; a network of military posts has grown; authorities have declared subsidies into the projects on the infrastructure development; scientific expeditions have progressed; plans aiming to improve the life of the Arctic residents have been created; and numerous experts have been speculating on

the good prospects of the Arctic development (The Arctic 2019). This activity is reminiscent of the Soviet projects. At the same time, visitors to the Russian Arctic still describe "ghost settlements" and other signs of decline, showing pictures of abandoned apartment blocks and the remains of destroyed equipment and expressing that regret that people are still forced to live in "intolerable" places.[1] This contrast raises the question of what is really happening in the Arctic. Will the development of the Arctic follow the original Soviet plans, or will this part of the Earth remain scarcely populated in the near future?

To answer this question, we must pay attention to the patterns of urbanization in the Russian Arctic, which have long been in process. Most of the population there lives in cities (Pilyasov 2016), as do residents of the arctic climate zone in general (Dybbroe et al., 2010). This article analyzes the circumstances of the formation, the present condition, and population dynamics of urban areas in the Russian Arctic during new millennium and estimates the prospects of their development.

Several definitions of the Arctic and its boundaries are in use, but the Arctic is usually defined as the area northwards from the Arctic Circle, that is northward from latitude 66° 33′ 44″. This means that the Arctic is a zone in which the sun is above the horizon—and then below the horizon—for twenty-four hours at least once per year each. However, there are other approaches to the definition; for instance, the northern borderlines of forests or southern borderlines of permafrost also can be used to identify the borders of the Arctic (Stishov 2013). The region with an average annual temperature of 0°C and within which the mean annual temperature for the warmest summer month is at or below + 10°C is also considered the Arctic; in this case the inland areas of Siberia and some mountains are also considered the Arctic (Nuttall 2005). The Russian Arctic is larger if considered from an administrative viewpoint. A presidential decree of 2014 pointed out the Arctic zone, with its boundary shifting significantly southwards of the Arctic Circle and including the entire coastal area of the White Sea. Some authors, especially non-Russian, tend to expand the Russian Arctic even more. Even some cities located close to the southern borderline of Russia in Siberia are sometimes included in the analysis of the Arctic, as is Sakhalin Island, which is close to Japan (Laruelle 2017; Orttung and Reisser 2014).

These broad views on the Arctic and the North contravene geography and partly distort the study of the Polar regions, although they represent specific interests of the scholars who define them. They have several distinct characteristics in addition to abnormal light/darkness

conditions: an especially short summer, scarce arboreal vegetation (which is a source of material for building and fuel), and remoteness from the zones of moderate or hot climate. At least some of these disadvantages are absent in subarctic or inland areas with relatively cold climate. This article addresses the strictest definition of the Arctic, that is the area northward from the Arctic Circle. This area seems to be especially unsuitable for human life, and the appeal of living there seems to be especially foreign for those living further south. However, the plans of the Arctic development take these difficulties into consideration. Numerous projects described a system of cities, roads, canals, dams, greenhouses, electric power stations , that is, the global transformation of enormous areas (Filin et al. 2018). This study of the circumstances of the urbanization of the Arctic is of interest when evaluating such perspectives.

Materials and Methods

In an administrative sense, the Russian territory located to the north of the Arctic Circle is shared by several subdivisions of the Russian Federation: Murmanskaya Oblast, Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug, Krasnoyarsk Kray, Republic Sakha (Yakutia), the Chukotka Autonomous Okrug, Arkhangel'skaya Oblast, and the Komi Republic. The first two of these are almost entirely located north of the Arctic Circle. The administrative centers of these subdivisions of the Russian Federation maintain databases on settlements. These databases were primarily used to collect information on urban areas (Chukotskii Okrug 2019; Krasnoiarskii krai 2019; Nenetskii avtonomnyi okrug 2019; Ofitsialnii portal respubliki Sakha (Iakutiia), 2019; Pravitel'stvo Arkhangel;skoi oblasti 2019; Pravitel'stvo Iamalo-Nenetskogo avtonomnogo okruga 2019; Pravitel'stvo Murmanskoi oblasti 2019; Respublika Komi 2019;). Data from the Russian Census, as well as other data from state statistics, were also used (Federal'naia sluzhba gosudarstvennoi statistiki 2019). Additional information regarding the formation of settlements was collected in the libraries of the Russian Academy of Sciences, St. Petersburg State University, and in the databases Russian Citation Index and Web of Science.

To determine whether a settlement can be considered an urban area for the purpose of this article, the classifications used by Russian authorities—city and urban settlement—were used. These characteristics are based primarily on the type of occupation of the local inhabitants;

most people in cities or urban villages are not involved in agriculture, hunting, or other rural activities. A settlement of 12,000 people or more is usually considered as a city, while that of 2,000–3,000 or more is categorized as an urban village. At the same time, there are no strict rules on this matter. Even smaller settlements, especially in the Arctic, may have features of urbanization such as urban development (paved roads, apartment blocks) and lack of farming. Therefore, the lower boundary is vague. Each subdivision of the Russian Federation officially defines which settlements must be considered as urban. In this article, it is assumed that if an Arctic settlement consists of at least 1,000 people if their main occupation is not farming or fishing, and if there are apartment blocks and other urban constructions, then this would be considered an urban area. In most cases, these small urban areas recently had larger populations, thus fully meeting the criteria of an urban settlement. The following characteristics of urban areas were described: location, time of the founding, main economic activity, and recent population trends (populations were estimated based on the 2017 data). To estimate recent population trends, the Russian Census data for 2002 and 2010 were used.

Results

Based on the aforementioned criteria, at least sixty settlements that can be considered cities or urban settlements are located in the Russian north of the Arctic Circle (table 1). Their population is a little more than one million people. Almost half of it is concentrated in two cities: Murmansk (300,000) and Noril'sk (180,000), while the rest of the urban areas have far fewer inhabitants. Half of these cities and urban areas are concentrated in Kola Peninsula, that is in the western extreme of the Russian Arctic. The other big center of urbanization exists in Western Siberia and adjacent areas of European Russia. The urban areas of the eastern extreme are relatively numerous, but very few people live in them (table 1). Most of the Russian Arctic looks like a desert in this respect; small urban settlements are scarcely distributed over huge territory (see figure 1).

Most of the Arctic cities originated in the twentieth century. Only two small cities were founded in the late eighteenth century, one in the early nineteenth century, and two at the end of the nineteenth century (table 1). Before that, there were almost no cities there. Pustozersk and Mangazeia seem to be an exception. The former, located in the

Table 1. Urban areas of the Russian Arctic (listed in the order of their location from west to east).

No.	Settlement	Coordinates, N, E	Time of foundation		Population			Background
			Beginning of settlement	Transformation into urban area	2002	2010	2017	
1	Murmansk	68°58′ 33°05′	1916	1916	336,137	307,257	298,096	Port, fishery industry
2	Kandalaksha	67°09′ 32°24′	1517	1938	40,564	35,654	32,034	Port, mineral resources
3	Beloye More	67°04′ 32°15′	1971	1971	767	660	No data	Transport
4	Nivsky	67°17′ 32°29′	1933	1933	1,265	1,043	No data	Electric power station
5	Alakurtti	66°58′ 30°20′	17th c.	1953	6,671	3,424	3,663	Military base
6	Zarechensk	66°40′ 31°22′	1957	1957	772	621	659	Electric power station
7	Kola	68°52′ 33°01′	16th c.	18th c.	11,060	10,437	9,701	Transport
8	Verkhnetu-lomsky	68°36′ 31°47′	1966	1966	2,003	1,580	1,260	Electric power station
9	Kildinstroy	68°48′ 33°06′	1937	1937	2,861	2,063	1,918	Industry (break factory)
10	Shoguy	68°45′ 33°09′	1959	1959	1,189	1,038	No data	Military base
11	Molochny	68°50′ 33°00′	1935	1935	5,627	5,208	4,944	Industry (satellite of Murmansk)
12	Murmashi	68°49′ 32°49′	1938	1938	16,343	14,152	13,817	Electric power station, transport
13	Tumanny	68°53′ 35°41′	1970	1970	950	685	579	Electric power station
14	Nikel	69°24′ 30°13′	1938	1938	16,534	12,756	11,599	Mineral resources
15	Zapoliarny	69°25′ 30°48′	1955	1955	18,640	15,825	15,194	Mineral resources
16	Pechenga	69°33′ 31°13′	16th c.	1945	2,959	3,188	2,941	Mineral resources
17	Sputnik	69°30′ 31°18′	1945	1945	2,246	2,061	No data	Military base
18	Luotsari	69°25′ 31°03′	1945	1945	2,210	2,260	No data	Military base
19	Umba	66°40′ 34°20′	15th c.	1898	6,497	5,532	4,658	Timber industry, transport
20	Apatity	67°34′ 33°23′	1935	1935	64,405	59,672	56,356	Mineral resources

Table 1. Urban areas of the Russian Arctic (continued).

No.	Settlement	Coordinates, N, E	Time of foundation		Population			Background
			Beginning of settlement	Transformation into urban area	2002	2010	2017	
21	Kirovsk	67°36′ 33°40′	1931	1931	34,759	30,990	28,863	Mineral resources
22	Kovdor	67°33′ 30°28′	1936	1936	20,867	18,820	16,892	Mineral resources
23	Yonsky	67°34′ 31°09′	1950	1950	2,026	1,534	No data	Transport, industry
24	Monchgorsk	67°56′ 32°54′	1936	1936	52,242	45,361	42,581	Mineral resources
25	Olenegorsk	68°09′ 33°17′	1949	1949	25,166	23,072	21,039	Mineral resources
26	Vysoky	68°08′ 33°25′	1953	1953	8,092	6,860	No data	Military base
27	Poliarnye Zori	67°21′ 32°29′	1968	1968	15,910	15,096	14,644	Nuclear electric power station
28	Afrikanda	67°26′ 32°46′	1925	1925	1,908	1,644	No data	Mineral resources, transport, military
29	Poliarny	69°11′ 33°27′	1896	1896	18,552	17,293	17,568	Military port
30	Gadzhievo	69°15′ 33°19′	1957	1957	12,180	11,068	12,904	Military port
31	Snezhnogorsk	69°11′ 33°13′	1970	1970	12,737	12,683	12,696	Military port
32	Vidiaevo	69°19′ 32°48′	1958	1958	6,182	5,771	6,146	Military port
33	Zaoziorsk	69°24′ 32°27′	1833	1958	12,687	11,199	10,019	Military port
34	Ostrovnoy	68°03′ 39°30′	18th century	1915	5,032	2,171	1,876	Military base
35	Severomorsk	69°04′ 33°25′	1896	1951	50,102	50,060	51,209	Military port
36	Safonovo	69°03′ 33°17′	19th century	1936	48,209	43,500	42,707	Military base
37	Belushia Guba	71°32′ 52°20′	1897	1954	2,622	1,972	2,405	Military base
38	Narian Mar	67°38′ 53°00′	1903	1931	18,611	21,658	24,654	Port, administration
39	Iskateley	67°40′ 53°08′	1974	1974	6,852	6,881	7,178	Mineral resources
40	Amderma	69°45′ 61°40′	1933	1933	647	541	577	Mineral resources

Table 1. Urban areas of the Russian Arctic (continued).

No.	Settlement	Coordinates, N, E	Time of foundation		Population			Background
			Beginning of settlement	Transformation into urban area	2002	2010	2017	
41	Vorkuta	67°30′ 64°02′	1936	1940	84,917	70,548	58,133	Mineral resources
42	Salekhard	66°32′ 66°38′	1595	1938	36,827	42,544	48,507	Port, administration
43	Labitnangi	66°39′ 66°23′	Beg. 19th c.	1952	27,304	26,936	26,281	Port
44	Harp	66°48′ 65°48′		1961	7,278	6,413	6,053	Transport of ore, prisons
45	Tazovsky	67°27′ 78°42′	1883	1964	5,965	6,793	7,201	Mineral resources
46	Dikson	73°30′ 80°31′	1915	1915	1,19,8	676	569	Port
47	Dudinka	69°24′ 86°11′	1667	1951	25132	22,175	21,513	Port
48	Norilsk	69°20′ 88°13′	1921	1935	134,832	175,365	178,018	Mineral resources
49	Igarka	67°28′ 86°34′	1931	1931	8,627	6,183	4,754	Port, timber industry
50	Tiksi	71°38′ 128°52′	1931	1931	5,873	5,063	4,604	Port
51	Verkhoyansk	67°33′ 133°23′	1638	1822	1,434	1,311	1,131	Port, food processing, administration
52	Batagay	67°39′ 134°38′	1939	1939	4,589	4,369	3,676	Mineral resources
53	Deputatsky	69°18′ 139°58′	1958	1958	3,602	2,983	2,967	Mineral resources
54	Belaya Gora	68°32′ 146°11′	1974	1974	2,463	2,245	2,074	Port, food processing, administration
55	Chokurdakh	70°37′ 147°54′	1936	1981	2,591	2,367	2,095	Port
56	Sredne-kolymsk	67°27′ 153°42′	1643	1775	3,587	3,525	3,488	Port, food processing, administration
57	Chersky	68°45′ 161°19′	17th century	1963	3,832	2,857	2,600	Port
58	Bilibino	68°03′ 166°27′	1956	1956	6,181	5,506	5,348	Mineral resources
59	Pevek	69°42′ 170°19′	1933	1933	5,206	4,162	4,547	Port
60	Mys Schmidta	68°54′ 179°27′	1961	1961	705	492	144	Port

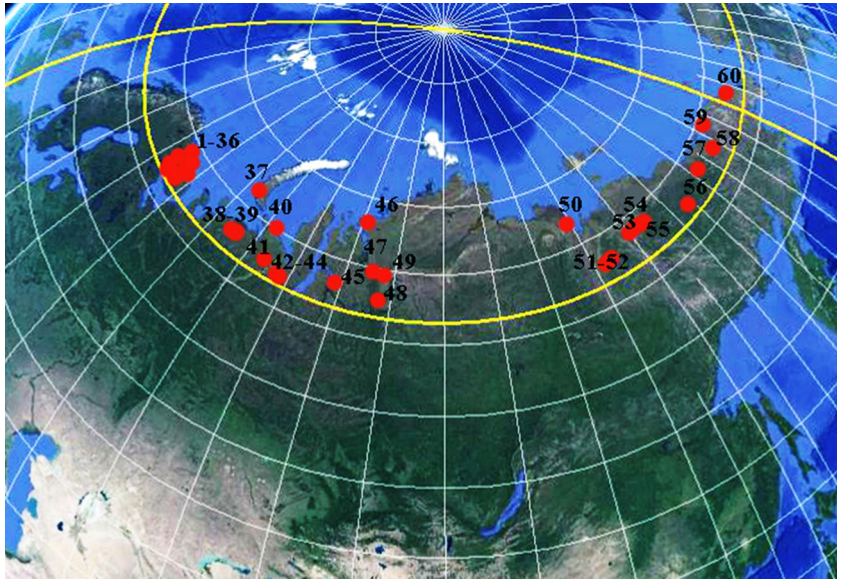

Figure 1. A scheme of urban areas locations northward from the Arctic Circle in Russia.

northeastern part of European Russia at the coast of the Pechora River, was founded in 1499. It rapidly developed for several decades and became an outpost of the Russian colonization of the Arctic. Its population reached 2,000 people in the sixteenth and seventeenth centuries, but later the city shrunk to the size of a small village and then disappeared completely in the middle of the twentieth century. It is now actively explored by archeologists, and a museum was established there (Istoriko-kul'turnyi i landshaftnyi muzei-zapovednik "Pustozersk" 2019). Mangazeia underwent a similar transformation but more rapidly (Belov 1969; Vershinin 2008). This settlement in the north of Western Siberia was founded in 1600 and developed rapidly thereafter. By the standards of that time, it was a true city, with a fortress, workshops, administrative buildings, a military post, three churches, and more than 200 residential buildings. Mangazeia was the center of administration and trade (primarily in furs). The city existed for about seventy years, but then it was abandoned and forgotten so thoroughly that stories about it were perceived as legends. Its existence was confirmed by archeology in the twentieth century. Mangazeia was "relocated" southeast to the Yenisei River under the name of New Mangazeia; later, its name was changed to Turukhansk, and then to Staroturukhansk. His-

toric studies mention the following reasons behind the disappearance of Mangazeia: fires, management failures, exhaustion of commercial stocks of fur animals in the surrounding area, and the blockade of the Northeastern Passage. Tsar Mikhail Romanov (1596–1645) forbade movement by sea in Siberia because he feared instigating the excessive activity of European merchants. To enforce this ban, a military outpost was founded on the Yamal Peninsula. It was difficult to bypass the outpost by sea, and so land and river trade routes developed in the inland part of Siberia, with settlements growing alongside them. Tsar Mikhail's ban was followed by the tsars until the eighteenth century.

Thus, the first attempt to urbanize the Arctic turned out to be unsuccessful, and later urbanization in the Arctic has also shown to be problematic. Russian colonization took place slowly, and the local indigenous people were uninterested in large settlements. Most of them were engaged in reindeer herding and preferred to continue their nomadic lifestyle. In the early twentieth century, Russian authorities tried to stimulate the foundation of settlements in the Arctic (and other remote areas of the empire) but were unsuccessful. A good example of this is the attempt to colonize Novaya Zemlya islands. Several Russian families agreed to immigrate there; they received credits and other benefits and built a small village in 1912, but the colony rapidly declined. Their earnings resulting from hunting did not cover the expenses, and they became insolvent debtors. This epopee was described by the participants of the polar expedition led by Georgii Sedov (1912–1914), who explored Novaya Zemlya and Franz Joseph Land and aimed to reach the North Pole. This expedition also demonstrated that the development of the extreme North was hazardous at that time. Its leader and one participant perished, and the expedition came back to the mainland with great difficulties (they even had to burn all wooden inner parts of the ship and any other combustible material; Pinegin 2009). The active colonization of the Arctic—including the establishment of urban settlements—became possible only several decades later, when technical capabilities had improved.

Many Arctic cities and urban villages were built in previously unpopulated areas (the indigenous population of the region used them, but there were no permanent settlements), and therefore their origins are well-documented. Sometimes the cities appeared in the place of small settlements that existed for several hundred years, but even in these cases the transformation of the village into a city occurred quickly and was also documented. Based on this information, several prevailing patterns of urbanization in the Russian Arctic can be identified (table 1).

The exploration of mineral resources prevailed during the formation of sixteen cities or urban settlements (Nikel, Zapoliarny, Pechenga, Apatity, Kirovsk, Kovdor, Monchegorsk, Olenegorsk, Iskateley, Amderma, Vorkuta, Tazovsky, Norilsk, Deputatsky, Batagay, Bilibino). These urban areas were built mainly in the 1930s, and significant numbers of people were forcibly transported there. With the passage of time such settlements sometimes became small or large cities. The very name "urban settlement" was coined for this type of development. They initially resembled rural settlements but were populated by industrial workers. At that time, industrialization and urbanization were popularized, and urban features of the settlements were stressed and developed. It was an essential part of Soviet ideology and politics.

About the same number of cities (seventeen) originated as ports and other transport hubs (Murmansk, Beloye More, Naryan Mar, Labitnangi, Salekhard, Dudinka, Dikson, Tiksi, Chokurdakh, Chersky, Mys Schmidta, Pevek, Kola, Srednekolymsk, Verkhoyansk, Belaya Gora). In some of these places other activities gradually developed. For example, some became administrative centers for large surrounding territories such as Murmansk, the largest Arctic city. It was built in a previously unpopulated area during the First World War to ensure communication with Russia's allies, France and Britain. It continued to develop after the war, becoming important for the entire country. Unlike other Russian northern ports, Murmansk is a warm water port that operates year-round. Destroyed during World War II, it was quickly rebuilt afterward and continued to develop. In addition to its function as the port, some industry has developed there, in particular, fish processing. Several additional ports close to Murmansk almost entirely support navy operations.

The growth of other ports in the Russian Arctic was related to either the exploration of natural resources or to the necessity of linking different parts of the country and the establishment of state control over the remote territories. Water transport is especially important in the Arctic because most of the settlements there are not connected by roads to the southern parts of Russia. A network of roads in Russia enters the Arctic only in the Kola Peninsula (Rosavtodor 2019). There is a railway there, too, which is one of the two branches of railways from the main part of Russia to the Arctic (RZhD 2019). The second one links the main part of European Russia with Vorkuta and the largest northern settlements of Western Siberia. Most of the Arctic settlements are not linked by roads with each other either, so cargo is usually trans-

ported by water. Local inhabitants call the main part of Russia *materik* (mainland) and feel themselves to be much like islanders.

The Arctic ports of Russia are located along the Northeastern Passage, the dream of seafarers of the past looking for a short way to India and China from Europe. However, these ports were developed for domestic needs rather than transportation between distant parts of the world. The global importance of Northeastern Passage is often declared, but it is still insignificant compared to the traditional routes through the Suez and Panama canals (Wegge and Keil 2018). It is not quite clear whether local ports decline because of the absence of active transportation or whether their poor condition precludes the development of active transportation in the first place.

Fourteen urban areas formed around military bases, mostly those housing the navy (Alakurtti, Shoguy, Sputnik, Luotsari, Vysoky, Poliarny, Gadzhievo, Snezhnogorsk, Vidiaevo, Zaoziorsk, Ostrovnoy, Severomorsk, Safonovo, Belushia Guba). In these cases, houses for the families of officers and other people involved in military activities were so numerous that a small city was formed. The operations of some of these bases involved nuclear energy and required a large industrial base, so the population of urban areas around them is relatively large. Several smaller urban settlements appeared inland as bases for air force or border security. Although military cities are numerous, their population is small compared to the cities mentioned above (table 2).

Six other urban areas (Nivsky, Zarechensk, Verkhnetulomsky, Murmashi, Tumanny, Poliarniye Zori) were founded during the construction of electric power stations. This happened in the Kola Peninsula, where five hydroelectric stations and one nuclear power station were built in areas that were almost completely unpopulated,

Table 2. Numbers and population sizes of the cities with various patterns of urbanization.

	Background for the foundation	Number	Population size
1	Centers of mineral resources extraction	16	458.563
2	Ports and other transport hubs	17	456,154
3	Cities around military bases	14	36,089
4	Cities around electric stations	6	31,964
5	Others	7	52,785

and urban settlements were constructed nearby. These stations are still in use, although the population of the settlements has declined. Seven urban areas do not quite fit in any of the above categories (Kandalaksha, Kildinstriy, Molochny, Umba, Yonsky, Afrikanda, Harp). Either they formed mainly as a result of some other activity such as industry or several processes contributed to their formation. They are all relatively small (table 2).

Food processing and wood processing take place in some Arctic cities or urban settlements, although these activities alone do not provide a sufficient basis for their existence. They are usually combined with some other driving forces of urbanization. Local biological resources, which are rather poor, are usually quite successfully processed in rural settlements. Murmansk is the main exception, but unlike other settlements with resource processing, its resources are intensively transported from outside the Arctic and Russia. Attempts to establish fish-processing enterprises on-site have been undertaken several times in many other places in the Russian Arctic, but all of them have failed. For example, a system involving fishermen, fish-processing workshops, and fur farms existed in Nenetsky Okrug for several decades (Rudnev 2010). Special settlements were established for this purpose, but the enterprise brought no profits and declined. The timber industry developed in the cities of Igarka and Umba for some time but eventually also collapsed (*Entsiklopediia Krasnoiarskogo Kraiia* 2019; Gorodskoie poseleniie Umba 2019; Ofitsial'nii sait goroda Igarka 2019). tourism is developing in the Arctic, and this process is especially noticeable in the Kola Peninsula. There are bases for recreational fishing, ecotourism,

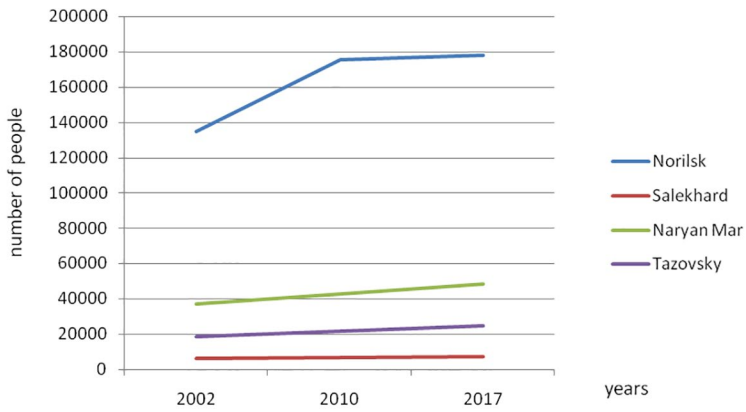

Figure 2. The recent dynamic of the population in the progressing Arctic cities.

and alpine skiing; their work directly or indirectly contributes to the development of some urban areas. However, it is insignificant compared to other activities in the cities.

Several cities in the Arctic lost the driving force behind their origin but still exist by inertia. For instance, the urban settlement of Amderma was built near a fluor-spar mine, which closed down a long time ago. Amderma still exists (Munitsipal'noe obrazovanie "Poselok Amderma," 2019), with its population stabilized at a low level. We can see similar cases in the ports of the eastern Russian Arctic, such as Chersky, Dikson, and Tiksi. They together alongside the economic activity in the surrounding territory and are often referred to as ghost cities; yet several hundred people still live there, and so these cities do not disappear completely. Local inhabitants speak evasively about this persistence. They are often engaged in rural occupations, especially fishing, while also receiving some support from the state.

Almost all cities and urban settlements are declining. In some cases, the decline is slow, while in others it is catastrophically swift. In nine urban areas (Pechenga, Severomorsk, Poliarny, Gadzhievo, Snezhnogorsk, Vidiaevo, Belushia Guba, Iskateley, Amderma), the population size remains stable, although at a low level. A population increase has been observed only in four cities: Naryan-Mar, Salekhard, Noril'sk, and Tazovsky (see figure 2). However, it is insignificant compared with the rate of decline seen in the other cities (Table 1). The total population of the Arctic has also declined (see figure 3). The data are not complete

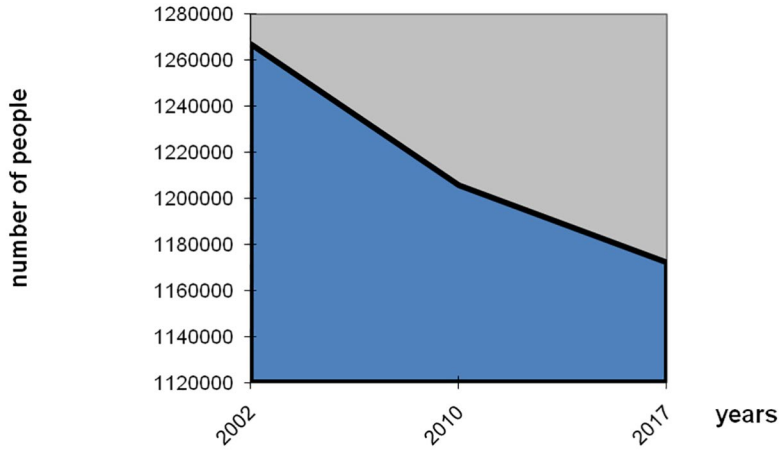

Figure 3. The recent dynamic of the urban population in the Russian Arctic.

for eight of the settlements, as the census was not conducted in 2017 in those locations, but they are small and would hardly change the general trend; according to the data from the previous years, their population has tended to either decline or stabilize. For these calculations, it was assumed that their population had not changed since 2010.

Discussion

The extraction of mineral resources is the most universal and large-scale factor leading to the formation of urban settlements in the Arctic. If those were absent, the urban areas in the Arctic would be extremely small, except for Murmansk and several military bases, and the total Arctic population would be many times lower. Ports, power plants, and transport hubs develop mainly in connection with the development of oil, gas, metals, and other mineral resources in the surrounding areas. Only at the western extreme of the Russian Arctic some other activities related to the progress of cities are noticeable. This extreme—that is, Murmansk and Murmanskaya Oblast—is in contrast with other parts of the Russian Arctic because of a relatively moderate climate and a good transportation connection with the main part of Russia and other countries (Laruelle et al. 2017). In other parts of the Arctic, activities unrelated to the extraction of minerals were found to be insignificant: they either have collapsed or are feeble and confined to small urban settlements. This means that only the urban areas related to the excavation of minerals appear to have prospects in the near future.

However, the analysis of population dynamic shows that even in these cases such prospects are doubtful since decline remains to be a major trend. Relatively rapid growth of population was registered only in Noril'sk about fifteen years ago, but it has since slowed down, and the number of citizens has tended to stabilize. At the same time, the population there is not permanent but is in a state of flux; some people arrive while others leave. Only a small part of the citizens plan to stay indefinitely (Urozhaeva 2016). The same is true of other settlements of the Arctic (Heleniak 2014; Laruelle 2017). Although the process is complex, the main trend in the Russian Arctic is depopulation. The recent increase of various activities in the Arctic is based on the shift method of work, which is becoming increasingly popular (Blagodeteleva 2016). Some camps for shift teams reach the size of an urban settlement but are still relatively small. The largest such shift settlement, Sabetta (located in the Yamal Peninsula), is designed for only 3,500 residents. Still,

it is a large hub of condensed gas, providing more than 20,000 jobs (Gritsenko and Efimova 2017; Sabetta, 2019). At present this settlement is considered to be flourishing, though there is still no permanent population (nineteen citizens were registered there before the construction of the hub). This means that had a city been built instead, it would require several thousand relatively permanent citizens. Shift labor is much more convenient, and much of the population of Arctic cities could seem excessive under modern conditions.

The recent population/depopulation tendencies in the Arctic lend support to the view that the Arctic was overpopulated during the Soviet period. Some authors claim that this is true not only of the Russian Arctic but also of Siberia in its entirety (Hill and Gaddy 2003; Rowe 2009). Their commentary suggests that the Soviet regime, through totalitarian dictates against its own people, moved people into unsuitable territories. It follows then, in order to restore justice, several million people should be moved from Siberia to European Russia (Hill and Gaddy 2003). The main argument in favor of this viewpoint is the fact that the cities of the Arctic and some parts of Siberia have declined rapidly after the collapse of the Soviet regime. Moreover, when it comes to the Arctic, this viewpoint is partially supported by medical considerations. In addition to the cold, human health is negatively influenced by abnormal daylight patterns such as excessive light in summer and lengthy darkness requiring artificial sources of light in winter. These factors increase the risk of cancer as well as accelerated senescence (Anisimov 2008). Moreover, the insufficient veterinary treatment of livestock is conducive to the spreading of infections; exploration of mineral deposits causes environmental pollution, which is harmful to health; hard labor conditions cause professional diseases of blood vessels and joints and, finally, such hardships can provoke the increased consumption of alcohol and tobacco (Gorbanev, Frolova, 2017). The list of health problems resulting from life in the Arctic is so long that it is unclear how one million people residing there continue to survive.

The concept of overpopulation of the Arctic elicited some protests from Russian authors (Bezrukov 2011), who typically do not question the good prospects for the development of Arctic cities even though few of them actually live there. There has been some speculation about the future urbanization of the eastern part of the Arctic, which is currently a desert (Baburin and Zemtsov 2015), and the possibility of turning this frontier into an El Dorado in the north of Russia (Martyanov 2015). A model of a self-sufficient Arctic city has been presented through the analysis of information about the city of Vorkuta, a coal mining center

(Dmitrieva and Buriy 2017).[2] These speculations are mainly based on the fact of the survival of Arctic cities after the economic collapse of the 1990s. The examples of some Arctic cities, in which the population has recently increased because of the intensification of exploration of mineral deposits, are also in use in this context. However, all of this remains unconvincing in the light of the above-mentioned population tendencies observed in the Arctic in general.

Some potential for the growth of cities in the Arctic is associated with indigenous people. The number of indigenous representatives engaged in traditional occupations is decreasing. In Russia they tend to resettle in the cities (Rozanova 2019). Some specialists endeavor to conserve these unique lifestyles but consider the pessimistic scenario—that the local inhabitants will soon lose their traditions—as the most probable (Koptseva 2017). Most of them will probably resettle in urban areas in the near future. However, indigenous residents are not numerous. In other countries sharing the Arctic, the indigenous people represent a significant part of the population: 80 percent in Greenland, 50 percent in Canada, 20 percent in Alaska, and 15 percent in Norway, while in Russia they represent only 5 percent (Laruelle 2019). According to the official statistics, they are labeled as *korennye malochislennye narody Severa* (the indigenous small-numbered peoples of the North). The largest indigenous ethnic group in the Russian Arctic is the Nenets people (nentsy), with a population of about 45,000. Almost all of them live in the Arctic, occupying a large area from the eastern coast of the White Sea to the Taymyr Peninsula (or from Arkhandel'skaya Oblast to Krasnoyarsk Kray). About 80 percent of the Nenets people live outside of the cities (Lukin 2013). Thus, if they all were to resettle in urban areas, this would result in an increase of the population in the Arctic cities by around 35,000. Other ethnic groups are either few or inhabit areas outside the Arctic Circle region. The total number of their representatives living in the Arctic (not in cities) is hardly more than 10,000 (Federal'naia sluzhba gosudarstvennoi statistiki 2019). Even if they were to resettle in the Arctic cities, the increase of the population of urban areas would be just about 45,000. However, when indigenous people move to cities, it does not mean that they choose the nearest Arctic cities. On the contrary, as the example of Yakutsk shows, they tend to migrate to the administrative centers (Sukneva and Laruelle 2019), and these are often located further away from the Arctic Circle. Therefore, it is probable that living in the Arctic cities, they also will eventually leave the Arctic as the colonizers have. So, even if all representatives of the

indigenous Arctic people would move to populate Arctic urban areas, such an increase would hardly change the general tendencies.

Some residents of the Arctic will not agree to resettle southward even if they have such a possibility. The history of Wrangel Island is a good example. A settlement, which had existed there since the 1920s, suffered a rapid decline in the 1990s and was officially closed in 1997. The residents were moved to the mainland, though a few people stayed behind. According to mass media reports, just one person lived there, at least until 2011 (Piatyi kanal 2011). The average summer temperature on Wrangel Island is +2°C, and the duration of such a summer is about a month and a half. It is hard to understand why an ordinary person would wish to live there, but some people apparently like it. Under less extreme conditions, such patriots would likely be more numerous. The data on Norilsk's population also demonstrate this. There was a special program to resettle the retirees to southern Russia, but several thousand retired workers continue to live there. Although this mostly seems to be due to the lack of funding and other financial difficulties, discomfort from leaving a habitual environment was also reported as a reason behind the reluctance to resettle (Urozhaeva 2016). However, relatively few people show such commitment to Arctic life, and their existence hardly would change the general tendency of the decline of the settlements there. Most people do not want to live in the Arctic for a long time, and this fact blocks all large-scale projects of the development of cities there. This means that the Soviet plans of Arctic colonization can only be partly realized in the foreseeable future.

The ongoing trend toward global warming might eventually make life in the Arctic easier. The sea ice of the Arctic Ocean is rapidly shrinking, stimulating the use of the Northeastern Passage and other human activities (Buixadé Farré et al. 2014) and increasing the biological resources in the Arctic Ocean (Haug et al. 2017). These changes could potentially contribute to the growth of cities in the Arctic. However, an opposite process is currently at work: the warming results in the melting of permafrost, which is the subsoil of most of the Arctic, and the melting results in the formation of thermokarst, holes in the ground several meters deep that fill with water. Such holes may appear anywhere, for example, under buildings, roads, and other constructions. Numerous Arctic settlements, including the giant city of Noril'sk, are built on permafrost (Shiklomanov et al. 2017), and the disappearance of subsoil could destroy many buildings there, effectively solving the question of whether to live or not to live in Arctic cities.

Thus, we have seen that the cities and urban settlements in the Russian Arctic are scarce and occupy a tiny part of its vast area. More than half of them are concentrated at the western extreme in a relatively small area, and only the extraction of mineral resources provides a relatively stable existence of large settlements over most of this region. Moreover, even in the case of successful economic activities, the main recent tendency of the Arctic settlements is a decline in the population; therefore, the prospects for any increase in size and number of the Arctic cities remain doubtful. The shift method of the human presence in the Arctic has become increasingly popular, and the recent increase of various activities in the Arctic has not changed this tendency. This means that the area of Russia northward from the Arctic Circle is hardly promising for the progress of the urban settlements. Although some Arctic cities have demonstrated some growth in the population, this is insignificant with respect to the entire Russian Arctic. This growth may be a temporary phenomenon, and the use of shift camps is likely to prevail in the future. The progress of the Arctic cities is problematic because of a trivial fact: humans, apart from a few diehards, simply do not prefer to live in the furthest reaches of the Arctic.

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Notes

1. See, for example, Dementievskiy 2019; *Guberniia Daily* 2019; Poselok Tiksi 2019. The author's observations of Arkhangelskaya Oblast, Nenets Autonomous Okrug, and Republic Sakha (Yakutia) provoked this impression too.

2. In fact, this may be a particularly unhappy example, as Vorkuta was one of the largest incarceration centers for prisoners in the 1940–1950s, and descendants of both prisoners and security guards still live there.

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