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Marine Conservation in the Russian Arctic

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Cover Graphic

The exclusive economic zone in the Russian Arctic (highlighted) and other coastal states on the map of the Arctic region. The blue line indicates the Arctic circle. IASS visualisation based on Flanders Marine Institute (2019), GRID-Arendal (2019).

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Note on Covid-19

This report was mainly prepared and written in 2020 and 2021 when the Covid-19 pandemic was spreading across the world, also affecting Arctic communities and economies.

Covid-19 affected the Arctic blue economy in several ways. The pandemic initially limited shipping and, with it, imports of fuel, food, and equipment as well as exports of oil, natural gas, minerals, and fish (Arctic Council, 2020). After this initial phase, the cargo transportation corridors continued operations and shipments through the Northern Sea Route actually saw an increase of 2.9% in the first 10 months of 2020 compared to the same period in 2019 (Staalesen, 2020a). However, tourist vessels and especially cruise ships were mainly absent from Arctic waters in 2020, and it is expected to take several years for the tourism and hospitality industries in the Arctic to return to 2019 levels (Arctic Council, 2020). In a similar manner, most marine research expeditions were either cancelled or reduced in 2020. While remote data collection could continue, pandemic-related cancellations of polar research expeditions have interfered with research typically being carried out during the summer Arctic surveys (Alaska Fisheries Science Center, 2020).

In the fisheries sector, labour shortages as well as Covid-19-related safety measures on board fishing vessels created new challenges and costs. At the same time, the role of hunting and fishing activities has increased in some areas and engagement in subsistence expanded because of the pandemic (Arctic Council, 2020). Finally, the downturn in oil prices led to a reduction of oil and natural gas production in the Arctic. However, while total oil production in Russia declined in 2020, output from the only offshore oil field in the Arctic, Prirazlomnoye, continued to increase, by 3% in 2020 and by 10% in 2021 (Alifirova, 2022).

While some of the impacts can now be detected, much uncertainty remains with regards to the extent of the economic downturn due to Covid-19 and how fast the different sectors will recover. What is becoming clear already is that the decreases in vessel traffic led to a significant decrease in shipping noise during the first half of 2020. In addition, pandemic-related safety concerns and economic slowdowns also decreased a multitude of other activities that generate ocean noise and other impacts, including fishing, aquaculture, seismic exploration, oil drilling, military exercises, offshore construction, and dredging activity for at least some portion of the pandemic (Carr, 2021).

Zusammenfassung

Die Arktis erwärmt sich substanziell schneller als der globale Durchschnitt. Der rasche Temperaturanstieg verändert die Arktis bereits tiefgreifend - und wird dies auch weiterhin tun - mit noch unbekannten Folgen für die Region und die ganze Welt. Gleichzeitig mit dem Rückgang des Meereises und der sich verändernden Verteilung der lebenden Meeresressourcen hat eine Zunahme des wirtschaftlichen Interesses an der Region zu Bedenken hinsichtlich der Nachhaltigkeit der wirtschaftlichen Aktivitäten in der Arktis geführt.

Um Wege zu finden, wie der Schutz und die nachhaltige Nutzung der arktischen Meeresumwelt gewährleistet werden können, ist ein umfassendes Verständnis der Meeresumwelt, der sie beeinflussenden Belastungen und der relevanten Regulierungen und Managementmaßnahmen erforderlich. Das Ecologic Institut und das Institute for Advanced Sustainability Studies haben sich zum Ziel gesetzt, durch eine Reihe von Berichten zum Meeresschutz in der Arktis einen Überblick über die relevanten Informationen zu geben. Die Berichte konzentrieren sich auf die fünf arktischen Anrainerstaaten: Kanada, Dänemark (durch Grönland), Norwegen, die Russische Föderation und die Vereinigten Staaten. Darüber hinaus gibt ein regionaler Bericht einen umfassenden Überblick und fasst die einschlägigen internationalen und regionalen Vorschriften zusammen.

Der vorliegende Bericht behandelt die für den Meeresschutz in der russischen Arktis relevanten Informationen. Der Bericht deckt vier Hauptthemen ab: Er beginnt mit der Beschreibung der wichtigsten Merkmale der Meeresumwelt der russischen Arktis. Anschließend werden wesentlichen Belastungen untersucht, die sich auf die marine Biodiversität in der Region auswirken, gefolgt von einer Untersuchung der soziokulturellen und wirtschaftlichen Rolle sowie der Umweltauswirkungen der wichtigsten meeresbezogenen menschlichen Aktivitäten in der russischen Arktis. Der letzte Teil des Berichts gibt einen Überblick über die relevanten nationalen Institutionen sowie über Regulierungen, Vorschriften und Instrumente, die zum Schutz der russischen arktischen Meeresbiodiversität und zur Gewährleistung ihrer nachhaltigen Nutzung eingesetzt werden oder eingesetzt werden könnten.

Hinweis: Die in diesem Bericht präsentierten Informationen wurden hauptsächlich während der weltweiten Covid-19-Pandemie und vor dem russischen Einmarsch in die Ukraine im Jahr 2022 zusammengetragen. Die (weiteren) politischen und wirtschaftlichen Auswirkungen dieser Ereignisse und die sich daraus ergebenden Veränderungen in der Arktis-Governance sind zum jetzigen Zeitpunkt nicht absehbar, und es ist zu erwarten, dass sich einige der in diesem Bericht dargestellten Entwicklungen und Trends erheblich ändern werden.

Die Kernbotschaften des Berichts finden sich unter der folgenden englischen Zusammenfassung.

Summary

Global interest and activity in the Arctic have increased greatly in recent decades. The Arctic is warming three times faster than the global average. These rapidly increasing temperatures are already profoundly changing – and will continue to change – the Arctic, with yet unknown consequences for the people, environment, and economy in the region as well as worldwide (SDWG, 2021).

The diminishing sea ice extent and the changing distribution of marine living resources have led to an increase in economic interest in the region as well as concerns about the sustainability of economic activities in the Arctic (Raspotnik et al., 2021). The challenge now is to identify development pathways that can ensure the sustainable use and conservation of the Arctic marine environment (SDWG, 2021).

In order to identify ways in which conservation and sustainable use of the Arctic marine environment can be ensured, a broad understanding of the marine environment, the pressures affecting it, and the relevant regulations is needed.

Ecologic Institute and the Institute for Advanced Sustainability Studies aim to provide an overview of relevant information through a series of reports on marine conservation in the Arctic. The reports focus on the five Arctic coastal states: Canada, Denmark (by virtue of Greenland), Norway, the Russian Federation, and the United States. In addition, a regional report is providing a broader overview and summarises relevant international and regional regulations. The reports were published in 2022 and are available for download on the websites of the Ecologic Institute and the Institute for Advanced Sustainability Studies.

This current report presents an overview of information relevant to marine conservation in the Russian Arctic. The report covers four main issues: it starts with the description of the key characteristics of the Russian Arctic marine environment. Then it examines significant pressures impacting marine biodiversity in the region, followed by exploring the socio-cultural and economic role as well as the environmental impact of the main sea-based human activities in the Russian Arctic. The last part of the report describes the Russian ocean governance system and provides an overview of relevant national institutions as well as rules, regulations and tools which are, or could be, employed to protect marine biodiversity in this region and ensure its sustainable use.

NB: The information presented in this report was mainly collated during the global Covid-19 pandemic and prior to the 2022 Russian invasion of Ukraine. The (further) political and economic impacts of these events and resulting changes in Arctic governance cannot be foreseen at this point in time and it can be expected that some of the developments and trends presented in this report may change substantially.

The following key messages are derived from the assessment:

The Russian Arctic Marine Environment

- The Russian waters in the Arctic comprise a vast area featuring marine areas, islands, and a large coastline.
- In the Barents and Bering Seas, cold Arctic and warm Atlantic or Pacific waters meet, forming areas which support a rich diversity and abundance of marine life.

- The Siberian Shelf seas – the Kara Sea, Laptev Sea and East Siberian Sea – are strongly influenced by sea ice cover.
- Areas of open seawater in the ice, so-called polynyas, are considered biodiversity hotspots in the region.
- Polar cod, capelin and Alaska pollock are considered key fish species in the Russian Arctic.
- Climate Change and Pollution: Key Pressures Affecting the Russian Arctic Marine Environment
- Warmer temperatures strongly affect the sea ice extent as well as the average thickness of sea ice, both of which are clearly decreasing.
- In general, the decline of ice cover is most pronounced along the frontal zones in the Barents Sea and the Bering Sea due to an increase in heat input from the Atlantic and Pacific waters to the Arctic Ocean.
- Climate change effects lead to shifts in the distribution of species and species communities. Especially in the Barents and Bering Seas, biota gradually acquires a warmer-water character while high-latitude Arctic endemic species retreat further north.
- The decrease of sea ice cover and associated changes in ecosystems negatively affect all ice-dependent species.
- Heavy metals are released into the northern Russian seas primarily though river runoff.
- Industrialisation efforts and various activities associated with the Soviet military complex contributed to accumulated damage and waste in the Russian Arctic.
- Marine plastic pollution has received little attention in the Russian Arctic so far but has not yet been reported as an important threat.

Sea-based Human Activities in the Russian Arctic

- The total population of the Russian Arctic is estimated at over 2.5 million people and accounts for around 40% of the circumpolar Arctic population.
- The Russian Arctic region is home to many Indigenous Peoples. The official list issued by the Government of the Russian Federation includes 40 Indigenous ethnic groups.
- The most significant socioeconomic activities in Russian Arctic waters are maritime shipping, fishing, and oil extraction.
- Generally, the western sector of Russia's Arctic is more economically developed than the eastern sector.
- Since the beginning of the twenty-first century, the Russian government has increasingly come to view the Arctic as a strategically important region and a key development priority.
- Maritime traffic in Russian Arctic waters is dominated by domestic shipping as well as imports to and exports from ports supporting the operations of settlements, mining, and fossil fuel companies. Most of the cargo consists of crude oil and liquified natural gas from terminals on the shores of the Barents and Kara Seas.
- Maritime shipping along the Russian Arctic coast is rapidly intensifying, among others due to the decline in sea ice and the resulting extension of the navigation season.
- The Russian fishing industry is predominantly export-oriented, with nearly a third of total production being exported.
- The main commercial fishing areas in the Russian Arctic are the Barents Sea and the Bering Sea. In the remaining parts of the Russian Arctic, the harsh climate, as well as low primary productivity, limits most fisheries to small-scale fisheries.
- The main target species in the Russian Arctic waters are Atlantic cod, haddock, and capelin.
- Several species of marine mammals, waterfowl, and some seabirds are hunted in the Russian Arctic for both subsistence and recreational purposes.
- The Prirazlomnoye field in the Pechora Sea is the only offshore oil extraction project in the Russian Arctic.

- Experts assess that in the medium term, new oil or gas production projects will not be feasible on the Russian Arctic shelf due to technological challenges, uncertainty concerning the resource potential, high costs, low oil prices, and unfavourable political conditions.
- Currently comparatively little tourism activity exists in the Russian Arctic.
- The most popular tourist sites for cruises in the Russian Arctic are Franz Josef Land and Novaya Zemlya.

Governance of the Russian Arctic Marine Environment

- The Ministry for the Development of the Far East and the Arctic is the main governmental body responsible for the coordination of the implementation of the State Programmes and management of federal property in the Arctic.
- Research on Arctic biodiversity is mainly conducted by state-funded academic institutions, above all, by the institutes of the Russian Academy of Sciences.
- Protected areas in the Russian Arctic have been established largely on an ad hoc basis, with a particular focus on terrestrial and freshwater ecosystems.
- Most of the existing marine protected areas are attached to coastal or island protected areas and act as their marine compartments or buffer zones.
- Protected areas that encompass or include marine zones can only be established at the federal level.
- The executive body responsible for the establishment, management and protection of marine protected areas is the Ministry of Natural Resources and Environment.

Contents

List of Abbreviations

AARI	State Scientific Center of the Russian Federation the Arctic and Antarctic Research Institute
AMAP	Arctic Monitoring and Assessment Programme (Arctic Council Working Group)
CAFF	Conservation of Arctic Flora and Fauna (Arctic Council Working Group)
CBD	Convention on Biological Diversity
EEZ	Exclusive Economic Zone
EMERCOM	Ministry of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
JRNFC	Joint Russian-Norwegian Fisheries Commission
LME	Large Marine Ecosystem
LNG	Liquefied Natural Gas
MPA	Marine Protected Area
NASCO	North Atlantic Salmon Conservation Organization
NSR	Northern Sea Route
OSPAR Convention	Convention for the Protection of the Marine Environment of the North East Atlantic
PAME	Protection of the Arctic Marine Environment (Arctic Council Working Group)
Rosgidromet	The Federal Service for Hydrometeorology and Environmental Monitoring
Rosmorrechflot	Federal Marine and River Transport Agency
Rosnedra	Federal Agency for Subsoil Use
Rostourism	The Federal Agency for Tourism
SDWG	Sustainable Development Working Group (Arctic Council)
TAC	Total Allowable Catch
UNESCO	United Nations Educational, Scientific and Cultural Organization
USSR	The United Socialist Soviet Republic
VAT	Value-Added Tax
VNIRO	Russian Federal Research Institute of Fisheries and Oceanography

1 Introduction

Global interest and activity in the Arctic have increased greatly in recent decades. The Arctic is warming three times faster than the global average. These rapidly increasing temperatures are already profoundly changing – and will continue to change – the Arctic, with yet unknown consequences for the people, environment, and economy in the region as well as worldwide (SDWG, 2021).

The diminishing sea ice extent and the changing distribution of marine living resources have led to an increase in economic interest in the region as well as concerns about the sustainability of economic activities in the Arctic (Raspotnik et al., 2021). The challenge now is to identify development pathways that can ensure the sustainable use and conservation of the Arctic marine environment (SDWG, 2021).

In order to identify ways in which conservation and sustainable use of the Arctic marine environment can be ensured, a broad understanding of the marine environment, the pressures affecting it, and the relevant regulations is needed.

Ecologic Institute and the Institute for Advanced Sustainability Studies aim to provide an overview of relevant information through a series of reports on marine conservation in the Arctic. The reports focus on the five Arctic coastal states: Canada, Denmark (by virtue of Greenland), Norway, the Russian Federation, and the United States. In addition, a regional report provides a broader overview and summarises relevant international and regional regulations. The reports were published in 2022 and are available for download on the websites of the Ecologic Institute and the Institute for Advanced Sustainability Studies.

This report presents an overview of information relevant to marine conservation in the Russian Arctic. The Russian waters in the Arctic span a vast area featuring marine areas, islands, and a large coastline. The delineation of Russia's Arctic area varies depending on the source and method. The legal delineation of the Arctic Zone of the Russian Federation, as specified by the Decree of the President of the Russian Federation 'On the Land Territories of the Arctic Zone of the Russian Federation', includes the jurisdictions along the coast of the Arctic Ocean and the adjacent internal sea waters, territorial sea, exclusive economic zone (EEZ), and continental shelf (Russian Federation, 2014a; Figure 1). The Arctic Council Working Group PAME recognises seven Large Marine Ecosystems (LMEs) within Russia's EEZ in the Arctic (from west to east): Barents Sea LME (including the White Sea), Kara Sea LME, Laptev Sea LME, East Siberian Sea LME, Northern Bering-Chukchi Sea LME, and West Bering Sea LME (Figure 1).

As it is challenging to access and compile data specifically regarding the Arctic waters of the Russian Federation, parts of this report include broader data covering all of the Russian Federation and more detailed information on Russian Arctic waters whenever feasible.

The report covers four main issues: it starts with the description of the key characteristics of the Russian Arctic marine environment. Then it examines significant pressures impacting marine biodiversity in the region, followed by an exploration of the socio-cultural and economic role as well as the environmental impact of the main sea-based human activities in the Russian Arctic. The last part of the report describes the Russian ocean governance system and provides an overview of relevant national institutions as well as rules, regulations and tools which are, or could be, employed to protect Russian Arctic marine biodiversity and ensure its sustainable use. An overview of relevant international and regional agreements and frameworks is provided in the regional report that forms part of this series of reports.

The content of this report is entirely based on publicly available data, articles, and reports. The data presented in this report were mainly collated during the global Covid-19 pandemic and prior to the 2022 Russian invasion of Ukraine. The political and economic impacts of these events cannot be foreseen at this point in time and some of the developments and trends presented in this report may change substantially.

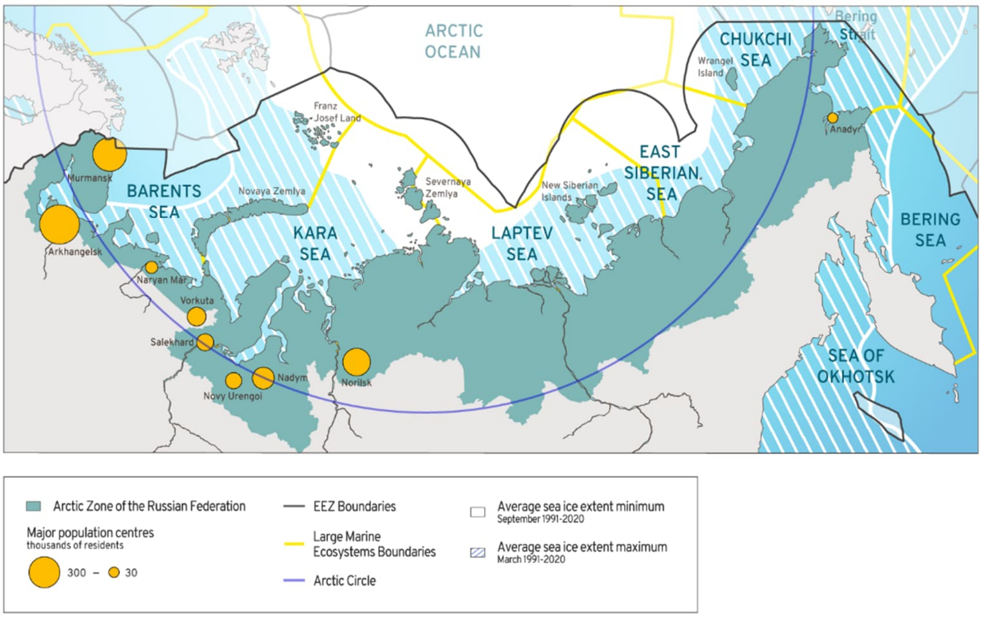

Figure 1: The exclusive economic zone in the Russian Arctic and the Arctic Zone of the Russian Federation. IASS visualisation based on Flanders Marine Institute (2019), Geofabrik GmbH & OpenStreetMap contributors (2022), GRID-Arendal (2019), Russian Federation (2014a), Sherman & Hempel (2008).

2 The Russian Arctic Marine Environment

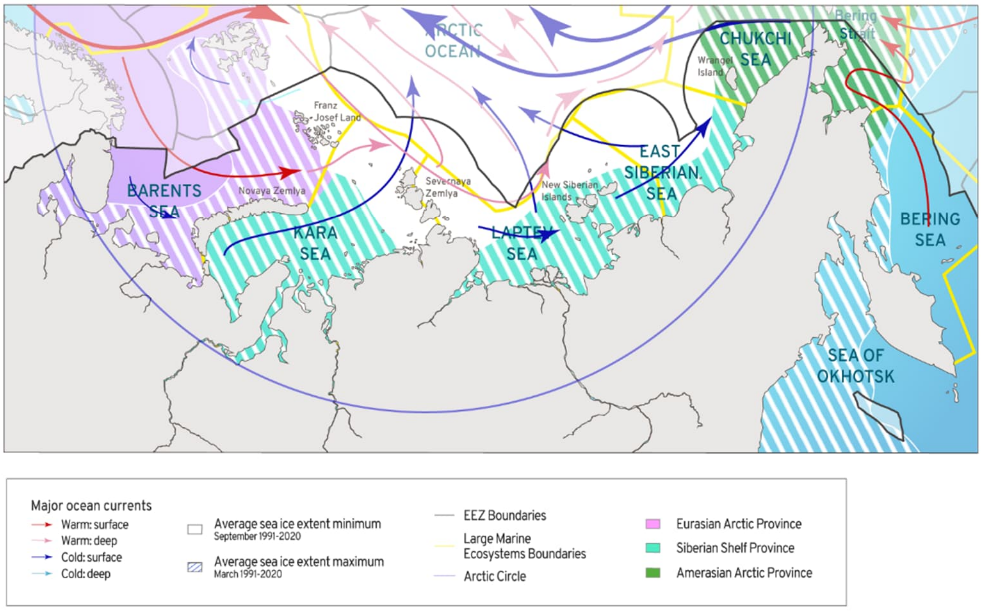

Figure 2: Physical map indicating main oceanic currents, biogeographic provinces, and Arctic Sea ice extent, focusing on the Russian EEZ in the Arctic. IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), Hunt et al. (2016), Sherman & Hempel (2008).

The Russian waters in the Arctic comprise a vast territory featuring marine areas, islands, and a large coastline. Most of these areas are located on the continental shelf and are relatively shallow (Table 1).

In the areas where cold Arctic and warm Atlantic or Pacific waters meet, so-called frontal zones, the transfer of nutrients creates favourable feeding conditions and supports a rich diversity of organisms, from phyto- and zooplankton to sea birds and mammals (Hunt et al., 2016; Spiridonov et al., 2020; WWF Russia, 2011). As a result, the Barents and Bering Seas are among the world's most productive marine ecosystems (CAFF, 2013; Table 1).

Table 1: Key characteristics of Russia's Arctic LMEs. Sources: GEF (2021), PAME (2013), Pauly et al (2020), WWF Russia (2011).

LME	Area in million km²	Shelf area in km²	Average depth of the seas in metres	Primary production in $mgCm^{-2}day^{-1}$
Barents Sea (incl. the White Sea)	2.01	919,627	Barents Sea: 230 White Sea: 67	439.46
Kara Sea	1.00	802,720	111	361.91
Laptev Sea	0.92	783,341	533	369.17
East Siberian Sea	0.64	518,845	54	145.84
Northern Bering and Chukchi Sea	1.36	994,363	Chukchi Sea: 71 Bering Strait: 50	370.40
West Bering Sea	0.76	113,202	Bering Sea: 1,547 (Shelf area: 100 - 300; Deep basin: 3,600 - 3,900)	670.01
TOTAL	**6.69**	**4,132,098**		**477.33**

Biogeographically, Russia's Arctic Seas can be divided into three main provinces that roughly correspond to the patterns of the major sea currents and distribution of core water masses: the Eurasian Arctic Province, the Siberian Shelf Province, and the Amerasian Arctic Province (Solovyev et al., 2017; Figure 2).

The Eurasian Arctic Province is associated with the influx of warmer Atlantic water masses that especially influence the southern and western parts of the Barents Sea, leading to about one-third of the sea being ice-free, with only the northern and eastern parts being ice-covered in winter (PAME, 2018a; Solovyev et al., 2017; WWF Russia, 2011; Figure 2). Along the line where the Atlantic and the Arctic waters meet in the central Barents Sea, an area of high biological productivity called the "Polar Front" is formed (Hunt et al., 2016; Spiridonov et al., 2020; WWF Russia, 2011).

The Siberian Shelf Province is characterised by significant amounts of river water discharge (Solovyev et al., 2017). The runoff into the Kara Sea alone comprises about 41% of the total river runoff into the Arctic Ocean and 56% of the runoff in the Siberian sector of the Arctic (Makkaveev et al., 2010). Additionally, the Siberian Shelf seas – the Kara Sea, Laptev Sea and East Siberian Sea – are strongly influenced by sea ice cover. The Kara Sea is usually fully covered by sea ice in winter (PAME, 2018d), while the Laptev Sea and the East Siberian Sea are heavily influenced by ice for most of the year (PAME, 2018c; Figure 2). The Laptev Sea is regarded as a major source of Arctic sea ice as ice formed in its waters in early winter drifts westward and contributes to the Arctic ice cover in more western areas (Alexandrov et al., 2000). A major frontal zone is found along the break of the Siberian continental shelf, where the upwelling fuels primary production (Hunt et al., 2016; Spiridonov et al., 2020; WWF Russia, 2011). In addition, areas of open seawater in the ice, so-called polynyas, such as the Laptev Sea Polynya and the Great Siberian Polynya have long been considered biodiversity hotspots in the region (CAFF, 2013; WWF Russia, 2011; Figure 3). They play a special role in supporting marine biodiversity by providing access to the air-water interface, as well as to food supply, during times when sea ice blocks access to open water across most of the Russian Arctic (Hunt et al., 2016; WWF Russia, 2011).

The Amerasian Arctic Province includes areas influenced by Pacific waters through the Bering Strait, which connects the Chukchi Sea with the Bering Sea (Solovyev et al., 2017; Figure 2). Mixing of the cold Arctic and the warmer Pacific waters results in elevated levels of primary production in much of the Chukchi and Bering Sea and forms another important frontal zone (Hunt et al., 2016; Spiridonov et al., 2020; WWF Russia, 2011; Figure 2). The warmer Pacific waters carry zooplankton into the Arctic, thus providing the Chukchi Sea ecosystem with its major food source (PAME, 2018f). In the Bering Sea, the north-eastern shelf region is usually covered by ice in winter, whereas the deeper south-western part remains open (PAME, 2018b). The shelf edge is one of the dominant drivers of primary productivity in the sea (Springer et al., 1996) and the polynyas along the southern coast of the Chukotka Peninsula are important wintering habitats for marine mammals (walrus, bowhead, and beluga) and birds such as eiders (PAME, 2018b; Figure 3).

Apart from the frontal zones and polynyas, the coastal zones, especially those close to the shallow continental shelf, also present particularly important areas for marine biodiversity. Due to their high productivity, they attract numerous fishes, seabirds, and marine mammals. Especially areas near the major river deltas are heavily used feeding areas due to the nutrients inflow (CAFF, 2013)

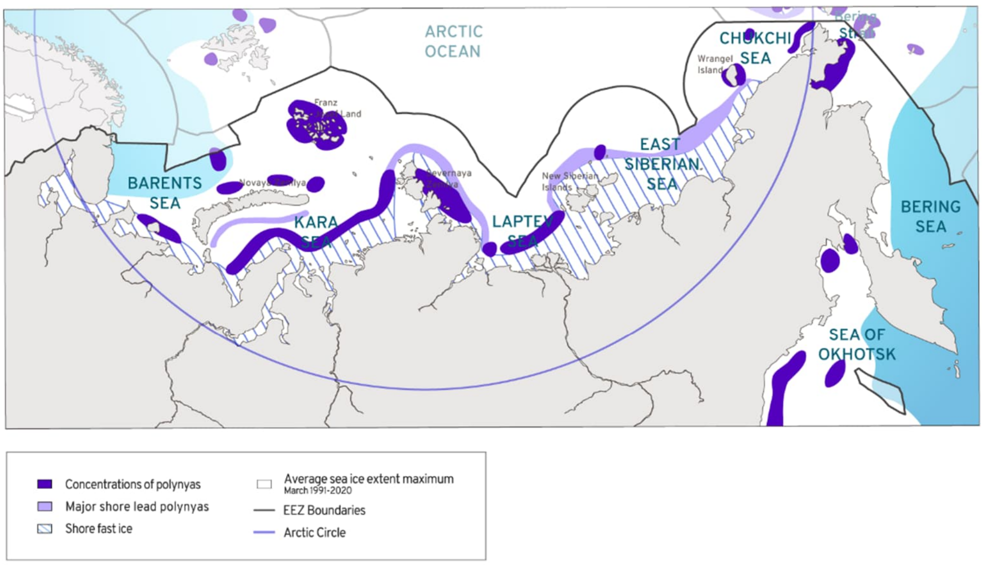

Figure 3: Known polynyas and ice conditions in the Russian Arctic. IASS visualisation based on: Copernicus Climate Change Service/ECMWF (2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), Meltofte (2013).

Fish Species

The Barents and Bering Seas are the most species-rich regions in the Russian Arctic, inhabited by 153 and 385 fish species respectively (CAFF, 2013). High primary productivity in these areas supports some of the greatest fish stocks and largest commercial fisheries in the world. The number of fish species in other Northern Russian seas is substantially lower, ranging between 32 in the East Siberian Sea to 75 in the Chukchi Sea (CAFF, 2013).

Polar cod is widespread throughout the entire region, living even inside the Arctic pack ice. It is the most abundant fish in the Russian Arctic and is regarded as a keystone species in many ecosystems of the region, especially in the Kara, Laptev, and East Siberian Seas (CAFF, 2013; Hunt et al., 2016; PAME, 2018e, 2018c, 2018d). In the Barents Sea, capelin is a key species (Hop & Gjøsæter, 2013). In the east, Alaska pollock is the most dominant fish species and a key component of the Bering Sea ecosystem (PAME, 2018b). All three species represent some of the most important high-energy prey for upper trophic levels (Hop & Gjøsæter, 2013; PAME, 2018b). Alaska pollock is also the most commercially exploited species in the region, followed by Atlantic cod in the Barents Sea fisheries (Pauly et al, 2020).

The distinguishing feature of the Kara and the Laptev Seas is the presence of freshwater, brackish water, and euryhaline[1] fishes as a results of numerous Siberian rivers discharging in the area (PAME, 2018e, 2018d). While data on population sizes and dynamics in the marine fish fauna of those seas is scarce, it is estimated that more than 50% of the marine fishes in those seas, as well as in the East Siberian Sea, are Arctic species which spawn solely at sub-zero temperatures (CAFF, 2013; PAME, 2018c). In contrast, in the Bering Sea, as little as 4.2% are Arctic marine species, which are mainly found in the cold waters of the northern shelf. Generally, the warmer waters of the Bering and Barents Seas are mainly dominated by boreal species adapted to warmer temperatures, with 81% and 58% of boreal fishes respectively (CAFF, 2013; PAME, 2018b).

Marine Mammals

According to the International Union for Conservation of Nature (IUCN) Red List, 45 species of marine mammals exist in Russian waters, 17 of which are present in the Arctic Sea area of the Russian waters. 11 of the marine mammals present in Russian waters are globally recognised as vulnerable or endangered[2] (IUCN, 2022; Annex 1, Table 4).

The Barents and Bering Seas are the areas with the greatest diversity of marine mammals within the Russian Arctic. The diversity and abundance of marine mammals is substantially lower in the other Russian Arctic seas, except the Chukchi Sea, where it is relatively high, mainly because of seasonal visitors from the Pacific (CAFF, 2013; WWF Russia, 2011).

Many species of marine mammals of the Russian Arctic require sea ice for feeding, resting, and raising young. Among them are seven pinnipeds: harp seals, hooded seals, bearded seals, ringed seals, spotted seals, ribbon seals, and walrus; three cetaceans: narwhal, beluga, and bowhead whale; and one fissiped: polar bear (Burns, 2009).

Polynyas play a special role in supporting the marine mammal populations by providing access to the air-water interface, as well as to the food supply (Hunt et al., 2016; WWF Russia, 2011). This is especially important for winter-resident species during the periods when ice blocks access to the open

[1] Species able to adapt to a wide range of salinities.

[2] The IUCN Red List threat category relates to the species as a whole, not necessarily to the population(s) in Russia.

water across most of the Russian Arctic. Thus, walruses, beluga whales, and bowhead whales often spend winter in or near polynyas (WWF Russia, 2011).

Seabirds

As with other species, the highest concentrations of seabirds within the Russian Arctic are found in the Barents and Bering Seas. The Barents Sea is an important feeding and breeding area for about 20-25 million seabirds (PAME, 2018a), while the Bering Sea supports 36 million individuals annually (PAME, 2018b). In the other regions, due to severe climate conditions and lower pelagic productivity, the diversity and numbers of individuals are significantly lower and largely consist of migratory birds (PAME, 2018d, 2018e, 2018f, 2018c; WWF Russia, 2011).

Coastal rocky outcrops are the most important nesting areas for colonial seabirds. In the Russian Arctic, such coastlines are found on the Kolsky and Chukchi Peninsulas, as well as the northern islands, including Franz Josef Land, Novaya Zemlya, Severnaya Zemlya, New Siberian Islands, Wrangel Island, and Bering Island. The other mainland coastlines are predominantly flat and used by facultative colonial and non-colonial sea birds (WWF Russia, 2011).

In addition, large colonies of seabirds, as well as migration routes, are associated with the sea ice margins and polynya systems (WWF Russia, 2011). The most prominent areas featuring sea ice margins and polynyas are Franz Josef Land and Novaya Zemlya polynyas in the Barents Sea, the Great Siberian Polynya, and western Wrangel polynyas across the Siberian Shelf seas, as well as the northern Bering Sea and Bering Strait region (PAME, 2018d, 2018e, 2018f, 2018c; WWF Russia, 2011).

Colony-based monitoring has traditionally been carried out in Specially Protected Areas (including Strict Nature Reserves and more recently, National Parks), but very few of the sites currently maintain seabird monitoring, leading to data gaps and making it difficult to assess trends. There is evidence, however, that the sizes of colonies on Novaya Zemlya have declined drastically compared to the early twentieth century, from two million to an estimated one million individuals (CAFF, 2017).

The main drivers for seabird population changes are thought to be fisheries activities (including bycatch), pollution, and changes caused by global warming (CAFF, 2013). Global warming is estimated to affect both food supplies and the optimal timing of breeding, ultimately resulting in lower breeding success for some species (CAFF, 2013, 2017).

Benthic Species

The distribution of benthic species in the Russian Arctic follows a similar pattern as other animals: the Barents and Bering Seas have the highest diversity, while the Siberian Shelf seas support much lower numbers. Thus, the number of documented species of benthic macro- and megafauna in the Barents Sea is in the range of 3,000 species, whereas there are an estimated 1,706 and 1,178 species in the Kara and the East Siberian seas respectively. It is important to note, however, that the latter regions are also less studied (CAFF, 2017).

Changes in seawater temperatures are leading to a northward expansion of boreal benthic species and a retreat of Arctic benthic species, especially in the shelf regions of the Barents and Bering Seas where warmer currents have a strong influence (Hunt et al., 2016; Spiridonov et al., 2020).

The most species-rich groups of benthic macro- and megafauna are arthropods (e.g., shrimps, crabs, sea spiders), polychaetes (e.g., bristle worms) and molluscs (e.g., gastropods, bivalves) (CAFF, 2017). Knowledge relating to benthic microfauna in this region, and the Siberian Seas especially, is scarce and fragmentary (WWF Russia, 2011).

The number of known established benthic alien species in the Russian waters of the Arctic is low. To date, two species of algae, three species of crab, and a caprellid are known alien species in the area (Spiridonov et al., 2012).

Fishing, especially bottom trawling, has been shown to have a strong impact on benthic communities in heavily fished regions of the Barents and Bering Seas. Denisenko shows that an increase of bottom trawling intensity in the Barents Sea during 1920-1997 was accompanied by a decline of zoobenthos biomass in the following years by almost 70%. Further, it is of interest to note that high values of biomass were recorded at the end of the 1940s corresponding to the absence of any significant fishery in the area during World War II (Denisenko, 2001).

3 Climate Change and Pollution: Key Pressures Affecting the Russian Arctic Marine Environment

3.1 Climate Change

Status

Climate change is a major driver of the transformation of the Arctic, including its Russian areas. The resulting transformations are inherently complex, but overall lead to an increase in temperatures and subsequent changes in ice cover. In the last thirty years, temperatures in the Russian Polar Region have been increasing on average by 0.81°C per decade. In 2019, the average annual air temperature was 2.8°C above the 1961-1990 average (Rosgidromet, 2020).

Warmer temperatures strongly affect the sea ice extent as well as the average thickness of sea ice, which is clearly in decline (Spiridonov et al., 2020). The sea ice extent across the Siberian Arctic seas, for example, has declined dramatically since the 1980s (Rosgidromet, 2020; Figure 4).

In general, the reduction of the ice cover is most pronounced along the frontal zones due to an increase in heat input from the Atlantic waters to the Barents Sea and from the Pacific waters to the Arctic Ocean through the Bering Strait (Spiridonov et al., 2020).

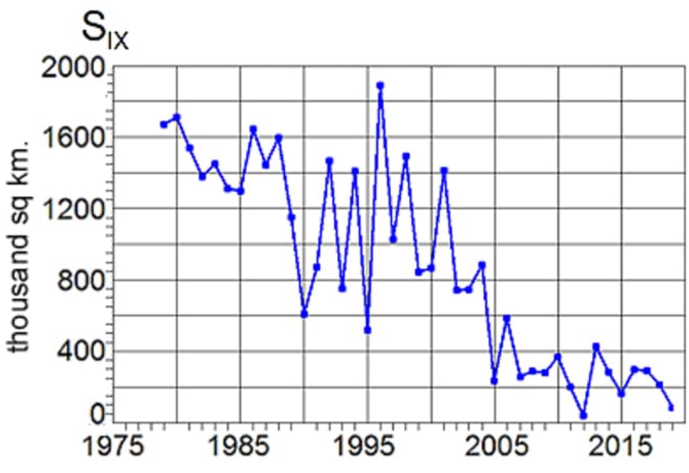

Figure 4: Area occupied by sea ice in September in the Siberian Arctic Seas (Kara Sea, Laptev Sea, East Siberian Sea, Chukchi Sea). Source: Rosgidromet (2020).

Related Impacts

Climate change effects lead to shifts in the distribution of species / communities described as borealisation. These shifts are especially evident in the Barents and Bering Seas (also affecting the Chukchi Sea), where biota gradually acquires a warmer-water character (Fossheim et al., 2015; Grebmeier et al., 2006; VNIRO, 2019). High-latitude Arctic endemic species retreat further north, while some of them, such as sea-ice dependent communities or less mobile benthic communities, may become endangered (Spiridonov et al., 2020).

In the northeast of the Bering Sea, the seasonal cold-water area that defines the boundary between the Arctic and Sub-Arctic communities has moved 230 kilometres to the north in the period between 1986 and 2006. The distribution centres for fish and invertebrates in those communities have shifted accordingly. The shifts are especially pronounced in summer, while the extreme winter conditions here are still a limiting factor for the long-term survival of sub-arctic and boreal species in these waters (Spiridonov et al., 2020). Besides, climate-driven changes in larval dispersal of many sub-Arctic and Arctic fish species, whose recruitment success is associated with dynamics of prevailing currents and ice edge feeding areas, have been identified as one of the major unknowns (Petitgas et al., 2013).

The reduction in the sea ice and associated changes in the ecosystems, including shifts in the density and distribution of prey species, negatively affect all ice-dependent species (CAFF, 2017). To name a few, there are observed declines in the fitness parameters and population sizes of walruses as well as bearded and ringed seals. This also has major effects on their main consumer: the polar bear (in addition to the direct impact of ice cover depletion on bears' travelling and foraging) (Spiridonov et al., 2020).

With regards to seabirds, there is some evidence of northward shifts of predominantly temperate or low Arctic species in the Bering Sea (CAFF, 2017). Simultaneously, the range of at least one of the ice-associated Arctic species, the ivory gull, has shrunk across all Arctic regions, including in the Russian Arctic, where it correlates with the northward movement of the summer ice edge (CAFF, 2017). Global warming is thought to change the ice dynamic, affect food supplies and the optimal timing of breeding, resulting in lower breeding success for some species, including black guillemots and little auk (CAFF, 2013, 2017). Additionally, the decrease in sea ice has led to an unexpected increase in polar bear predation on seabird nests, including not only ground-nesting seabirds such as glaucous gull, but also cliff-nesting species, such as thick-billed murre (CAFF, 2017).

The changes in seawater temperatures also inevitably impact benthic communities. In general terms, a northward expansion of boreal species and a retreat of Arctic species can be observed, especially in the shelf regions of the Barents and Bering Seas where warmer currents have a strong influence (Hunt et al., 2016; Spiridonov et al., 2020).

3.2 Pollution

Status

Hazardous substances in Russian Arctic waters include heavy metals and persistent organic pollutants. Persistent organic pollutants comprise various pesticides and industrial chemicals as well as their by-products, which are listed under the Stockholm Convention due to characteristics such as environmental persistence, bioaccumulation, long-range transport, and toxicity (AMAP, 2021). In addition, marine litter increasingly contributes to the pollution of the Russian Arctic marine environment.

Heavy metals, such as mercury, cadmium, and lead are released into the environment from both anthropogenic sources such as coal burning and mining, as well as from natural sources such as the weathering of rocks. In addition, the use of leaded gasoline used to be a major source of atmospheric lead before it was banned in many countries during the 1970s and 1980s (Bradl, 2005).

Generally, heavy metals are released into the northern Russian seas primarily though river runoff, while the contribution of atmospheric fluxes is significantly lower (Vinogradova & Kotova, 2019). One exception is the Barents Sea, for which the transportation of pollutants from outside the sea via marine currents is significant (Ilyin et al., 2015). In addition, the sources of pollution and the associated environmental risks are determined by the development of economic activities. For example, the Murmansk industrial hub contributes to pollution in the Barents Sea, while the White Sea is exposed to numerous anthropogenic sources of heavy metal emissions into the atmosphere resulting from industrial activities (Ilyin et al., 2015; Vinogradova & Kotova, 2019).

Persistent organic pollutants remain in the environment for a long time and can therefore be transported over long distances. In general terms, most of the persistent organic pollutants in the Arctic environment stem from industrialised regions further south and were transported to the Arctic via wind and ocean currents. As a result of internationally agreed bans and use restrictions, the concentrations of several persistent organic pollutants in Arctic biota are declining (Rigét et al., 2019).

In the Russian Federation, industrialisation efforts and the development of the military complex during the Soviet era resulted in various environmental harms and the accumulation of significant quantities of waste in the Russian Arctic areas. When, in the early 1990s, many of the military units, settlements, scientific stations and ports were rapidly closed and abandoned, most of the equipment and materials remained in place and were not properly conserved. Hundreds of thousands of barrels with oil products, more than a million empty barrels, equipment and machinery, infrastructure objects, sunken vessels, landfills of household waste and scrap metal were left behind. The affected areas include many islands and coastal zones inhabited by marine mammals and sea birds, including now protected areas on Franz Josef Land, Novaya Zemlya, Wrangel Island, etc. (Pettersen, 2012; TASS, 2017).

In addition, there is a significant risk of nuclear contamination as a result of military and civilian activities in the region (Solovyanov, 2011). Besides nuclear weapons testing conducted on Novaya Zemlya (including underwater offshore tests), the Kara and Barents Seas were used for the disposal of liquid and solid radioactive waste and nuclear submarines, most of which remain on the sea bottom (Sarkisov et al., 2011; TASS, 2020a).

A massive Arctic clean-up programme was launched by the Russian government in 2012, with a particular focus on the Franz Josef Land and Novaya Zemlya archipelagos. In eight years, around 90,000 tonnes of waste have been removed and disposed of from these territories. Work on Franz Josef Land is estimated to be 90% complete (Interfax, 2020).

Marine plastic pollution has received little attention in the Russian Arctic so far and has not been reported as an important threat (CAFF, 2019). Recent assessments indicate inter alia that the Great Siberian Rivers as well as the North Atlantic are important sources of microplastics and that floating microplastics become trapped by sea ice and get transported via the sea ice drift (Bergmann et al., 2022; Yakushev et al., 2021). In an initial assessment, floating marine macro litter was only detected in Atlantic waters inflowing from the Barents Sea, whereas no floating marine macro litter could be detected in the waters of the Kara Sea, Laptev Sea and East Siberian Sea (Pogojeva et al., 2021). In general terms, increasing pollution by plastic waste was observed in the Barents Sea (Grushenko, 2018). Although the available scientific data remains insufficient, assessments suggest that fibres or threads from fishing nets as well as open waste disposal sites and abandoned landfills are important sources of plastic pollution in the Barents Sea (Bergmann et al., 2022; Grushenko, 2018).

Related Impacts

Industrial pollution resulting from natural resources extraction with little or no environmental safeguards is estimated to be a major cause of the strong decline in catches in the Russian Arctic (Zeller et al., 2011). Fish stocks known to be negatively affected by pollution are whitefish, Atlantic salmon and sturgeon in the Pechora and Ob drainage basins in the Russian Arctic (FAO, 2007). Elevated levels of heavy metals were detected in fish caught in the Russian northern seas, especially in the Barents Sea. Cod displayed higher levels of arsenic, while salmon displayed elevated levels of lead (1.5 times higher than the norm) and cadmium (2 times higher than the norm) (Regnum, 2019).

The corrosion of barrels abandoned following the collapse of the Soviet Union results in the leakage of oil products and related contamination. The level of soil contamination on some islands of the Franz Josef Land archipelago, for example, reaches 100-200 times the threshold limit value; while the average total content of polycyclic aromatics exceeds the threshold limit value by two to eight times. Additionally, radioactive waste poses a serious threat to the Arctic Seas, as there is a high risk of leakage of radioactive substances into the environment at many disposal sites (Balakireva, 2021).

Trends

In November 2020, the Ministry of Natural Resources and the Environment announced the development of a new clean-up plan for the following years (TASS, 2020b). Also, in August 2020, the State Nuclear Energy Corporation Rosatom announced plans to raise the six most nuclear-hazardous objects from the sea bottom in the following eight years (TASS, 2020a).

4 Sea-based Human Activities in the Russian Arctic

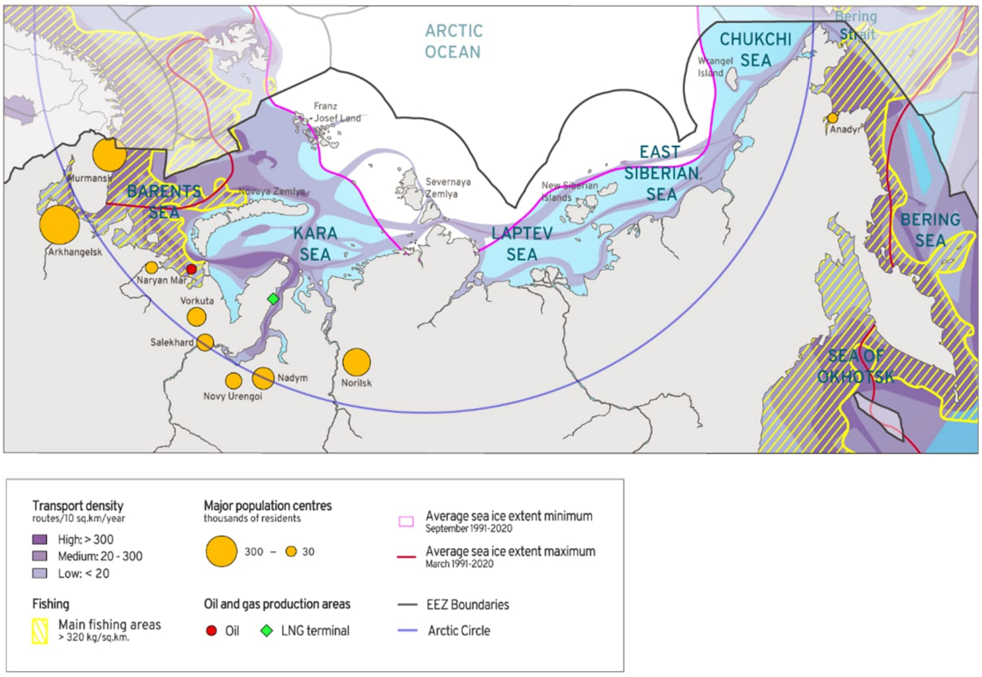

Figure 5: Overview of the major sea-based human activities within the Russian exclusive economic zone (except tourism and aquaculture). IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), MarineTraffic (2021), Pauly et al. (2020), Löschke & Lehmköster (2019).

The Arctic zone of the Russian Federation is rich in natural resources. While the area is home to less than 2% of Russia's population, the economic activities carried out here (both land- and sea-based) generate 12-15% of the country's GDP and about one-quarter of the country's exports (Plotnikov et al., 2018).

The total population of the Russian Arctic is estimated at over 2.5 million people and accounts for around 40% of the circumpolar Arctic population. Although Russians and other non-Indigenous ethnic groups predominate numerically (accounting for more than 96% of the population), the region is home to many Indigenous Peoples (Tishkov et al., 2015). These are legally recognised under the Russian census category of 'Indigenous small-numbered peoples of the North, Siberia and the Far East', which encompasses ethnic groups living in territories traditionally inhabited by their ancestors, maintaining traditional lifestyles, and numbering less than 50,000. Due to this definition, Russian law does not regard the Sakha residing in north-eastern Siberia as an Indigenous group because of their late arrival in the region and the size of the population, even though they are recognised as Indigenous internationally (Ksenofontov et al., 2017).

The official list issued by the Government of the Russian Federation includes 40 Indigenous ethnic groups (Russian Federation, 2006). According to the 2010 census, the biggest of these is the Nenets (41,849 people), while some of the smallest Indigenous groups consist of just a few hundred persons or even fewer. The biggest proportion of Indigenous Peoples in the regional population is found in the Nenets Autonomous District (17.83%), the Arctic municipal units of Sakha Republic (Yakutia) (22.66%), and the Chukotka Autonomous District (33.42%) (Tishkov et al., 2015).

The most significant socioeconomic activities in Russian Arctic waters are maritime shipping, fishing, and oil extraction. The tourism sector is small but is expected to grow in the future.

Both economic development activities and the maintenance of existing infrastructure in the region are very costly, as most materials and goods must be shipped great distances under challenging conditions, and infrastructure of all kinds is limited. In addition, most of the region has experienced a significant outflow of people following the collapse of the Soviet Union. Generally, the western sector of Russia's Arctic is more economically developed than its eastern part, with several cities of more than 100,000 inhabitants (Arkhangelsk, Murmansk, Norilsk) and more advanced infrastructure, including the key port facilities in the region (Fondahl et al., 2020; Figure 5).

Since the beginning of the twenty-first century, the Russian government has increasingly come to view the Arctic as a strategically important region and a key development priority. This reflected in a comprehensive package of policy documents developed over the last two decades.

'The Basics of State Policy in the Arctic for the Period Until 2035' was approved in March 2020. The document defines the goals and objectives of the development of the Arctic zone of the Russian Federation and succeeded "The Basics of State Policy in the Arctic for the Period Until 2020 and Beyond" from 2008. The key strategic planning document for implementing the State Policy is the "Strategy for the Development of the Arctic Zone of the Russian Federation and National Security until 2035" which succeeded the "Arctic Strategy Until 2020" from 2013 (Figure 6).

The mechanisms for the implementation of the Strategy are outlined in the state programme "Social and Economic Development of the Arctic Zone of the Russian Federation". The new "State Programme for the Period Until 2035" adopted in March 2021 succeeded the previous State Programme from 2014. It is a complex cross-sectoral policy with the main goal of accelerating the socioeconomic development of the region through state investments in infrastructure, subsidies for business, etc. The programme's stated key objectives include the increase of non-budgetary investments and creation of jobs and improvement of social protection of the population (Russian Federation, 2021b). All of the other key state programmes (on the development of healthcare or transportation, etc.) also include sections on the development of the Arctic territories and foresee additional funding in the respective areas.

In summer 2020, the Government approved the "Federal Law on State Support of Entrepreneurial Activity in the Arctic Zone of the Russian Federation", which aims to boost investment in projects across the Russian Arctic and stimulate the creation of new enterprises and jobs. The law assigns the entire Russian Arctic the status of a special economic zone and delivers a range of tax benefits, streamlined administrative procedures, and other support measures for businesses. The law also exempts icebreaking services and the shipping of export-oriented goods from value-added tax (VAT) and allows for the creation of free zones in ports (freeports) (Russian Federation, 2020c). A special development zone – the “Capital of the Arctic” – was already established in the Murmansk region prior to the law’s adoption. Its residents profit from an exemption from VAT on import and export of goods and enjoy significant tax benefits (Russian Federation, 2020b).

Figure 6: The main policy documents governing the development of the Arctic Zone of the Russian Federation

4.1 Shipping

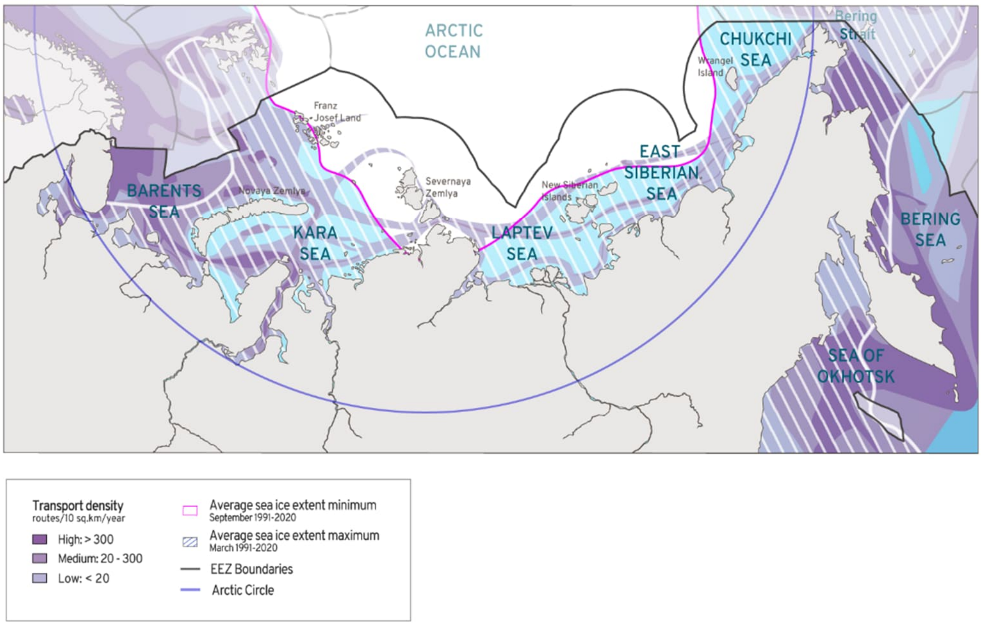

Figure 7: Transport density in the Russian exclusive economic zone. IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), MarineTraffic (2021).

Quick Facts on Shipping in The Russian Arctic

- Main areas: Along the coast of Barents and Kara Seas, Bering Strait and the coast of Russian Far East, Northern Sea Route
- Summary & Trend: Strong activity in the Barents, Kara and Bering Seas, likely to increase further; Strong potential related to diminishing sea ice coverage along the Northern Sea Route and expected increased oil and gas extraction (mainly on land)

Socio-cultural and Economic Relevance

Active exploration of the Russian Arctic Seas and the Northern Sea Route (NSR) began in the nineteenth century with various Russian and European expeditions, although the first documented attempts to cross the NSR took place in the sixteenth century (Johannessen et al., 2007; Pastusiak, 2016). According to Russian legislation, the NSR lies east of Novaya Zemlya and runs along the Russian Arctic coast from the Kara Sea to the Russia-United States maritime border in the Bering Strait (Russian Federation, 2012).

The Committee for the Northern Sea Route (now the Northern Sea Route Administration) was established in 1919 to explore the possibilities for maritime transport in the Arctic Seas. During the Soviet era, maritime activities accompanying the industrialisation efforts and development of the military complex began in the region and the exploration and use of the NSR have greatly accelerated. Icebreakers, civilian and military vessels, the Soviet submarine fleet, and drifting ice stations were active in the region especially in the 1970s and 1980s (Johannessen et al., 2007; Pastusiak, 2016).

In the 1990s, after the collapse of the United Socialist Soviet Republic (USSR), traffic declined dramatically, up until the late 2000s (Johannessen et al., 2007; Pastusiak, 2016). Today, maritime shipping along the NSR is rapidly intensifying. In 2019, some 31.5 million tonnes of cargo was transported on the route, marking an almost tenfold increase since 2011 (Ministry of Transport, 2020). In 2020, maritime shipping continued to grow despite the Covid-19 pandemic, with the number of transits along the entire length of the NSR rising from 37 for the whole of 2019 to 62 transits in 2020 (in the period ending 9 December) (Saul, 2020).

The development of transportation policies and infrastructure is tightly connected to the exploitation of the Arctic natural resources. Maritime traffic in the Russian Arctic waters largely comprises domestic shipping between Arctic cities and harbours as well as imports to and exports from ports supporting the operations of settlements, mining, and fossil fuel companies (Borch et al., 2016). Most of the cargo consists of crude oil and LNG from terminals on the shores of the Barents and Kara Seas. The development of the Yamal LNG project and the subsequent increase in LNG cargo has been a key driver in the development of the NSR, for example. As industry grows, aided by massive state support, maritime shipping will continue to expand as the sea route is currently the only efficient way to deliver these resources from remote Arctic locations to European and Asian customers (CHNL & BIN, 2019; Spiridonov et al., 2020; Vavina & Toropkov, 2020).

Fishing, cruise tourism, naval operations, and scientific research also contribute to shipping traffic in the Russian Arctic (Spiridonov et al., 2020). Since the early 2000s, the Russian Federation has been increasing its military presence in the Arctic following a decline in the wake of the collapse of the Soviet Union. Today, the Northern Fleet, headquartered in Severomorsk on the Kola Gulf (Barents Sea), accounts for more than half of Russia's naval capacities. The fleet has over forty nuclear and diesel-powered submarines and an equal number of surface ships at its disposal in addition to a well-developed coastal defence system (Protopopow, 2020).

The increase in traffic has been facilitated by rising temperatures and the resulting decline in sea ice, which has extended the navigation season (CHNL & BIN, 2019). Areas along the NSR have been warming rapidly since the late 1990s. Over this period, winter temperatures have increased by around 5°C and summer temperatures by 1.5°C (Rosgidromet, 2020). Thus, in 2020, the NSR was mainly ice-free from mid-July through late-October and icebreakers as well as ice-hardened tankers could successfully make several voyages along the route as early as June (NSIDC, 2020). The Russian Federation operates the world's largest icebreaker fleet, comprising 39 vessels, including two nuclear-powered icebreakers (Atomflot, 2020; Rosmorport, 2020). Recent technological advances in ice-strengthened vessels and the introduction of icebreaking cargo vessels able to operate year-round in Arctic waters without assistance are gradually making Arctic navigation more economical (CHNL & BIN, 2019).

Nevertheless, the climate of the Russian Arctic coast remains hostile, with extremely low temperatures, seasonal sea ice cover, and year-round difficult ice conditions in the eastern part of the NSR. Maritime operations require extensive cold-resistant infrastructure and a fleet of icebreakers and ice-strengthened vessels, as well as winterisation of other vessels during the winter months, advanced rescue capacities, and special crew training to operate under harsh Arctic conditions (CHNL & BIN, 2019).

Main Areas

Shipping density is the highest in the coastal areas of the Barents Sea and the south-western part of the Kara Sea along the routes from the Kara Strait and Cape Zhelaniya to the gulfs of Ob and Yenisei. Further, navigation along the coast of the Chukchi Sea to the Bering Strait is also noticeably more intense than in other Arctic areas where sea ice conditions are much more severe during the winter-spring season (seven months; December-June) (CHNL & BIN, 2019; Figure 7).

The key transhipment and service harbours are located in Murmansk on the Barents shore and in Arkhangelsk on the White Sea. Apart from supporting maritime operations, they play an important role in servicing other Russian Arctic ports with food, fuel, and other supplies during the summer-autumn season through the so-called 'northern deliveries' (CHNL & BIN, 2019).

Over the last decade, the Ob Bay of the Kara Sea has been the site of several major transport infrastructure projects, including the development of the Port of Sabetta on the eastern coast of the Yamal Peninsula to serve the Yamal LNG project and the Arctic Gate Oil Terminal at Cape Kamenniy (CHNL & BIN, 2019). Much less infrastructure exists in the eastern part of the NSR, with only a few ports of limited capacity in Khatanga, Tiksi and Pevek. Transport routes to more southern locations in Siberia are limited to the Lena, Yana, Indigirka, and Kolyma rivers, but these are only fully ice-free for three months in summer (CHNL & BIN, 2019).

Related Impacts

Virtually all activities in the Russian Arctic involve the use of maritime transport, which is almost inevitably a source of marine pollution by petroleum products and other toxic substances, waste from ships, as well as of the introduction of alien species. It is also a source of the disturbances such as noise and light pollution. Besides, shipping infrastructure development, especially bottom dredging, as well as the destruction of the ice cover and shipping vessels themselves can disturb or even destroy habitats (Spiridonov et al., 2020). For example, the increase in traffic through the Bering Strait threatens to displace bird populations that forage there during summer and autumn in large numbers (CAFF, 2017).

Heavy ice conditions pose a risk to ships and can cause incidents which result in marine pollution. A permission-based system was introduced to reduce such risks to some extent since only ships meeting a set of requirements are allowed to enter the region. However, multiple violations have been recorded, ranging from procedural breaches to deviations from approved routes and – most concerning – operations in ice conditions that exceed vessel ice-class (Humpert, 2017). Also, though the fleet is being modernised, there are still many old vessels, especially in the fishing fleet. State investment in the search and rescue fleet has been considerable and the fleet is now equipped with several top-level rescue vessels of different types (Borch et al., 2016).

Russian military activities are largely restricted to select areas but can be a source of significant disturbance, as the construction and establishment of associated coastal infrastructure can negatively affect or even destroy bottom and coastal habitats. Naval exercises, including live fire exercises, can cause severe disruption in aquatic environments (Spiridonov et al., 2020). Russian naval activities also impose strong restrictions on environmental protection in the areas where they occur (Spiridonov et al., 2020).

Trends

The NSR is Russia's main northern maritime transport artery and government policy identifies the Arctic as a key national interest (Russian Federation, 2020e). The "Plan for the Infrastructure Development of the Northern Sea Route until 2035" sets out Russia's development policy for the region over the short and medium term. According to the document, annual shipping on the NSR is expected to rise to 80 million tons by 2024. The plan covers a wide range of measures, including massive infrastructure development, the expansion of the fleet, mapping of Arctic natural resources, and the launch of new satellites for remote monitoring of activities on the route. The infrastructure developments include major dredging operations in the Gulf of Ob, the upgrade of four regional airports, and the construction of numerous railways and seaports (Russian Federation, 2019).

The development of shipping activities along the NSR is strongly associated with the future oil and LNG production in the Arctic (CHNL & BIN, 2019; Spiridonov et al., 2020; Vavina & Toropkov, 2020). Four out of the eight new liquefaction plants planned in Russia by 2035 are located in the Arctic (Ob LNG, Arctic LNG, Arctic LNG-2, Arctic LNG-3 (all of which are located on the Yamal and Gydan peninsulas) (Tikhanov, 2020).

The Russian Federation has pledged to massively expand its northern fleet as part of its efforts to support the development of the NSR. At least 40 new vessels are expected to be built by 2035, including nuclear icebreakers, hydrographical ships, and various support and rescue vessels. If the construction of new vessels continues as planned, year-round navigation along the NSR might become possible by 2025 (Russian Federation, 2019).

Despite the strong political ambition of the Russian Government with regards to Arctic maritime shipping, the economic viability of the NSR is still a subject of debate. The hostile climatic conditions and sea ice variability, complexity and high costs of navigation, lack of infrastructure, and environmental concerns are among the main challenges, and it remains to be seen whether they can be successfully overcome (McGee, 2020; Tugushev, 2020). In addition, sea level rise, increasing frequency of storms, and thawing of permafrost pose the risk of erosion and threaten infrastructure as well as key ports and terminals (McGee, 2020).

Last but not least, the political and practical consequences of Russia's invasion of Ukraine are likely to pose significant challenges for infrastructure and fleet development efforts. The EU recently adopted a broad range of sanctions targeting the energy, transport, technology and financial sectors (European Commission, 2022). Norway has banned vessels registered under the Russian flag from entering Norwegian mainland ports from 7 May 2022. The ban applies to all vessels of 500 gross tonnage or more, with exemptions provided for vessels engaging in fishing, search and rescue or research activities (Government of Norway, 2022).

4.2 Fishing & Hunting

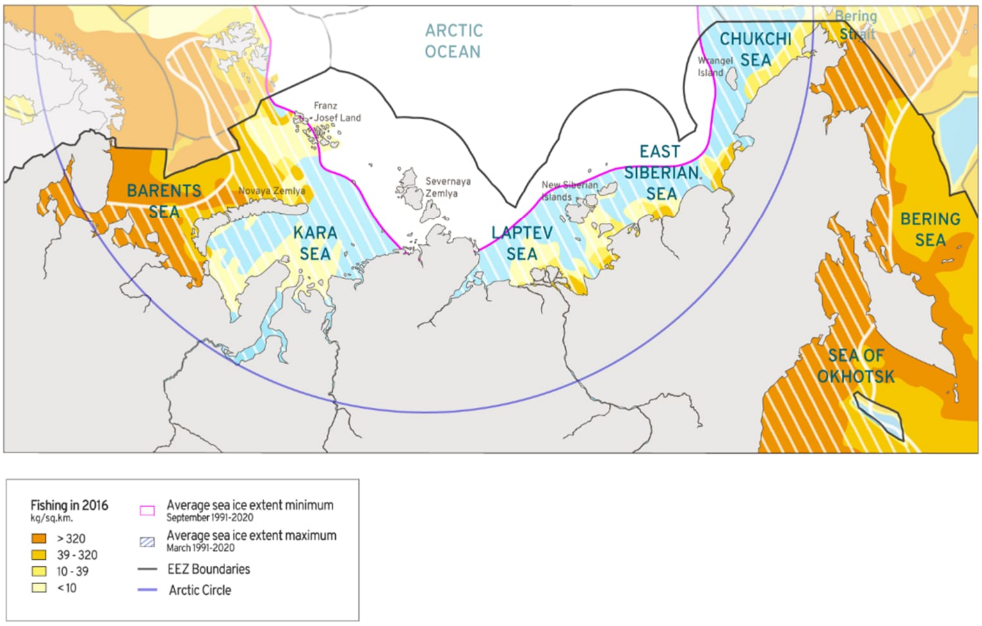

Figure 8; Fishing effort in Russian Arctic waters. IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), Pauly et al. (2020).

Quick Facts on Fishing in the Russian Arctic

- Capture in tonnes (2019)[3]: 1,287,764 tonnes in Arctic waters including West Bering Sea
- Main areas: Barents Sea, Bering Sea
- Summary & Trend: Currently comparatively little fishing activity, except for Barents and Bering Seas; potential for expanding fisheries is unclear as climate change impacts enable access to new areas but may not lead to higher productivity

Socio-cultural and Economic Relevance

Fisheries in the Russian Federation can be broadly divided into marine fisheries, inland fisheries, and aquaculture. Marine fisheries deliver the great majority of the total fisheries catch in the Russian Federation (Figure 9). In 2019, the Russian marine capture totalled 4,816,627 tonnes, around a quarter of which are estimated to be from the Russian Arctic (Federal Agency for Fishery, 2020).

[3] Own calculation based on: Federal Agency for Fishery (2020)

Industrial fishing in Russia is mainly carried out by trawlers targeting Alaska pollock, redfish, cod, halibut, redfish, flounders, and shrimp. In general, the fishing fleet and port infrastructure in the Russian Federation are outdated and need to be modernised (Eynde, 2017). This process is currently under way and will lead to a smaller fleet of vessels with larger capacity (Borch et al., 2016). According to current planning, eleven new 'super trawlers' with an annual catch capacity of 60,000 metric tons will be constructed to renew the fleet. The first of these entered operation in 2021 and the second vessel is scheduled to be commissioned in 2022 (FishFocus, 2022).

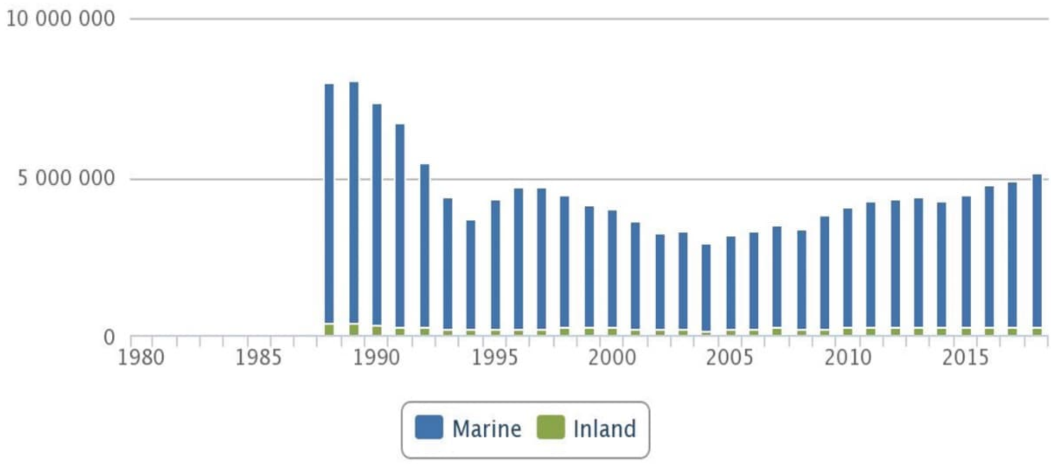

Figure 9: Capture production by inland and marine waters in the Russian Federation in tonnes. Source: FAO FishStat (2020).

The Russian fishing industry is predominantly export-oriented, with nearly a third of total production being exported. The Russian Federation exports fish and seafood primarily to East Asian markets, especially China (31% of the total value in 2019) and South Korea (27%), as well as the Netherlands (16%) (Agroexport, 2020). Due to a lack of fish processing capacity, the Russian Federation typically exports catches without any processing (Eynde, 2017; Ministry of Labour and Social Protection, 2019).

While fishing contributes less than 1% to the national GDP, some regions depend greatly on the fishing industry (Russian Federation, 2014b; Ministry of Labour and Social Protection, 2019). In most of the Russian Arctic, catches are limited but fishing and related businesses provide an important source of income for communities living near the coast (Russian Federation, 2014b).

The main target species in the Russian Arctic waters are Atlantic cod, haddock, and capelin (Figure 10). Reported catches for the Russian Arctic are generally believed to be too low, indicating a likely underreporting, even when taking into account the harsh climate and low primary productivity limiting fisheries in some areas (Popov & Zeller, 2018; Zeller et al., 2011; Figure 10).

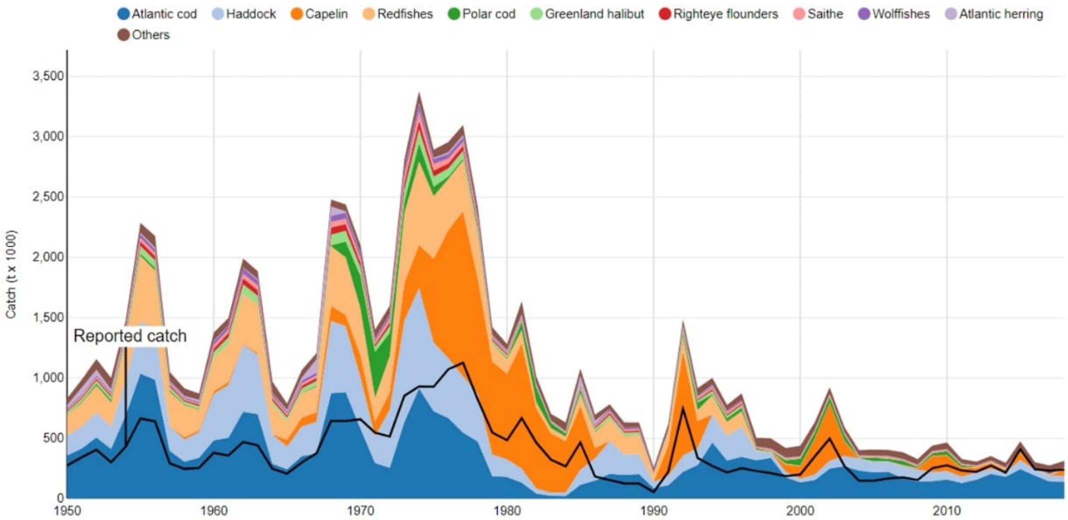

Figure 10: Reconstruction of fisheries catches data for Barents Sea, Kara Sea, Laptev to Chukchi Sea. Note: Catches from the Bering Sea are not included in this graph. Source: Pauly et al. (2020).

Marine mammal hunting in the Russian Arctic is presently undertaken by the Yuits and coastal Chukchi, which reside on the Chukchi Peninsula in Chukotka Autonomous District. Hunting is one of the main occupations of these Indigenous Peoples and is fundamental to their way of life and culture. Chukotkan whaling activities traditionally target gray whales and bowhead whales (IWC, 2022a). In addition, bearded seal, ringed seal, spotted seal, ribbon seal, walrus, and beluga whales are hunted and birds' eggs are collected for subsistence purposes. Also, waterfowl and some seabirds are hunted for both subsistence or recreational purposes (Spiridonov et al., 2020). Data on catches of marine mammals and seabirds are not readily available. Reported numbers include catches of gray whales and bowhead whales related to traditional whaling activities in Chukotka as well as catches of harp seal and hooded seal, which are reported to the International Council for the Exploration of the Sea (ICES) and include catches for scientific purposes (ICES, 2019; IWC, 2022b; Annex 2, Table 5).

Although the hunting of polar bears is banned in the Russian Federation, poaching has been an issue in the 2000s. Poaching incidents declined when 'Bear Patrols' involving local communities were initiated in villages in Yakutia and Chukotka by WWF Russia in the early 2010s (Priemskaya, 2019).

Main Areas

The Far Eastern basin (includes Laptev Sea, East Siberian Sea, Bering Sea, Sea of Okhotsk, and Sea of Japan) is Russia's main fishing region and accounts for around 70% of the total marine capture production (Eynde, 2017). The main commercial fishing areas in the Russian Arctic are the Barents Sea and the Bering Sea. In the remaining parts of the Russian Arctic, small-scale, near-shore fishing predominates due to the harsh climate and low productivity of fisheries (Taconet et al., 2019). Fishing areas may expand though: In 2020, the Ministry of Agriculture established quotas for pollock fishing in the Chukchi Sea (at 68,000 tonnes), where it had previously not been exploited (Fishnews, 2020a). In the Laptev Sea and the East Siberian Sea, small-scale fisheries exist mainly in the estuaries of Siberian rivers (Figure 8).

Related Impacts

The most direct impact of fishing is the mortality of target species (CAFF, 2017). Several central fish stocks in Russian waters have declined in the past due to natural fluctuations as well as overfishing. Among these are the Atlantic and Pacific herring, Alaska pollock, and capelin (FAO, 2007). Overfishing has been well-documented in the Barents Sea where it has also led to the decline of seabird colonies on the Murman Coast (CBD, 2014; Popov & Zeller, 2018).

The indirect impacts of fishing activities, such as bycatch, habitat loss and seabed disturbance, depend greatly on the species targeted and gear employed.

Apart from these impacts, fishing vessels, like all ships, contribute to underwater noise and may contribute to overall pollution through small fuel spills during routine operations or accidents (see chapter on shipping impacts).

Trends

While the Russian fishery sector is growing, several hurdles continue to stifle its development, including an ageing fishing fleet, lack of adequate port infrastructure, administrative barriers, and investment deficits (Eynde, 2017).

The Russian Government has sought to address these hurdles and promote growth through various strategies. “The Strategy for the Development of the Arctic Zone of the Russian Federation and National Security up to 2035” lists fishery and aquaculture developments among its priorities, aiming at the upgrading of old and building of new fishing vessels, the building of modern facilities for the deep processing of aquatic bioresources, and the development of aquaculture.

In 2019, the “Strategy for Development of the Russian Federation Fishery Sector until 2030” was approved. The strategy was elaborated by an expert committee including fishery authorities, fishery associations and fishing companies. It outlines the sector’s priorities, growth drivers, government support, and local programmes aimed at advancing the fishery sector. Amongst the main priorities for the sector is the modernisation of the fishing fleet, the construction of new fish processing facilities and distribution centres in the Far East, and the development of aquaculture and mariculture in the Far East. Furthermore, investment in research to study the possible increase of fishing in Arctic waters is encouraged.

The development of free ports along the NSR may significantly help to improve port infrastructure in the Russian Arctic, establish more efficient transportation routes and thus promote overall growth in fishing activities (Tugushev, 2020).

It remains to be seen, though, weather climate change impacts will benefit or threaten Arctic fisheries in the Russian Federation. While the decline in sea ice creates opportunities to intensify fishing activities, it will also result in the reduction of both plankton stocks and primary productivity, which in turn reduces the number of fish. Against this backdrop, the profitability of Russia’s expansion of fishing in its Arctic waters remains unclear (Stupachenko, 2018).

4.3 Offshore Oil & Gas Exploration and Exploitation

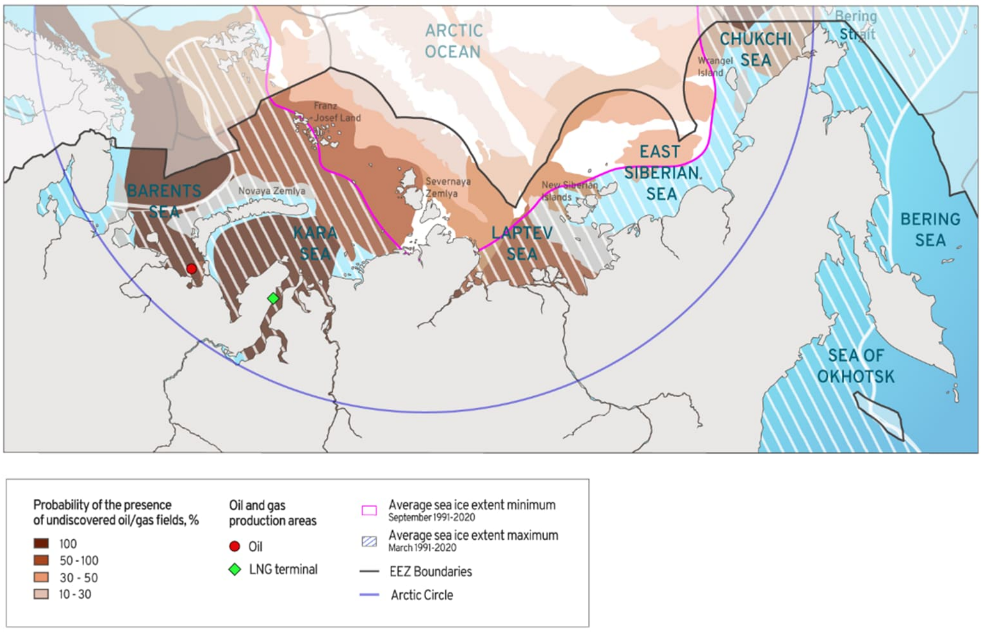

Figure 11: Current oil and gas production areas and probability of the presence of at least one undiscovered oil and/or gas field with recoverable resources greater than 50 million barrels of oil equivalent according to USGS 2009 survey results. IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), Löschke & Lehmköster (2019).

Quick Facts on Offshore Oil and Gas Exploration and Exploitation in the Russian Arctic

- Oil and gas fields in production: Prirazlomnoye oil field in the Pechora Sea
- Production volume:
- Oil: 3.6 million tons (2021)[4]
- Main areas for exploration: Kara Sea, East Barents Basin, and Pechora Sea
- Summary & Trend: High potential, especially in the Kara Sea and East Barents Basin but activity in the Arctic is expected to remain limited in the near future due to technological challenges, low prices, and unfavourable political conditions; likely development in the long-term if conditions improve

Socio-cultural and Economic Relevance

The petroleum sector plays a critical role in the Russian economy, contributing a major share to the country's federal budget: 4% in 2017, 46% in 2018, 39% in 2019 (Ministry of Finance, 2020).

[4] Source: Gazprom (2022)

Offshore oil and gas production, however, does not play a major role in the Russian petroleum industry. The only offshore development in the Arctic, the Prirazlomnoye oil field in the Pechora Sea, accounted for less than 1% of total oil production volume in 2021[5]. As inland fields are gradually depleting, state and private actors are considering options for the future exploitation of oil and natural gas reserves of the Arctic shelf to maintain stable production levels (Amiragyan, 2017).

Main Areas

To date, the Prirazlomnoye field in the Pechora Sea is the only offshore oil extraction project in the Russian Arctic (Amiragyan, 2017). Oil production at the Prirazlomnoye field is carried out by Gazprom Neft. The site is close to Dolgiy Island in the south-eastern Barents Sea, which is a part of the Nenets Nature Reserve (Nenentskiy Zapovednik). The proximity of the nature reserve raised concerns among ecologists and Greenpeace activists targeted the platform in 2013 (Spiridonov et al., 2012b; Ria News, 2013).

Rosneft, Gazprom, and Gazprom Neft hold licences (over 50 as of 2020) for geological exploration and the development of oil and gas resources in the Arctic Seas. Rosneft holds the majority of licences: 19 areas in the Western Arctic (in the Barents, Pechora and Kara Seas) and nine areas in the Eastern Arctic (Laptev, East Siberian and Chukchi Seas). After the withdrawal in 2014 of international partners from Arctic projects in Russia, Gazprom and Rosneft suspended work on these projects, but later resumed exploration activities on their own and in collaboration with new Asian partners, focusing primarily on the Barents and Kara Seas (Amiragyan, 2017).

In December 2020, Rosneft announced the discovery of three new Arctic gas fields in the Kara Sea with total reserves of 1.736 billion m3. In addition, there are more than 30 other prospective sites in the Kara Sea. Furthermore, five fields have been discovered in the Pechora Sea (TASS, 2020c).

Related Impacts

The environmental impacts of offshore oil and gas operations depend on the activities being carried out during the main phases of exploration, production, and decommissioning.

As part of the exploration phase, seismic surveys are conducted to understand the geology and identify potential hydrocarbon reservoirs. Impacts of seismic surveys include loud underwater sound and light emissions as well as increased vessel activity. Impact assessments of acoustic disturbance have so far principally focused on marine mammals, with reported effects including disruption of normal behaviour related to feeding, breeding, resting, migration, masking of sounds, as well as hearing damage. The effects on fish and invertebrates are not well studied, but may be considerable (Cordes et al., 2016).

If promising reservoirs are detected, one or more exploration wells are drilled to gain more insight into the nature of the reservoir. The drilling leads to the release and disposal of waste such as drill cuttings, excess cement, fluids (drilling mud), contaminated water, and various chemicals, which may cause serious harm to the marine environment (Cordes et al., 2016).

The release of toxic compounds into the environment and occasional accidents make the actual extraction process likely the single greatest human-induced contributor to local pollution (CAFF, 2017).

Gazprom emphasises its efforts to ensure the Prirazlomnoye development is environmentally sound and claims that the platform operates on a ‘zero emissions’ basis (all operational waste goes into a

[5] Own calculation based on Gazprom (2022), Soldatkin (2022)

special absorption well or is returned to the mainland for disposal) and is equipped with state-of-art spill prevention systems that are capable of shutting off oil-lifting operations (Gazprom, 2022). The authors are not aware of independent assessments of these claims.

In addition, all major hydrocarbon businesses operating in the Arctic, including Novatek, Gazprom Neft and Rosneft, maintain special programmes for ecosystem and biodiversity monitoring in order to minimise impacts (Gazprom Neft, 2020; Novatek, 2019; Rosneft, 2019).

The vast distances and harsh climate in the Arctic compound the risks associated with the production and transportation of petroleum products and make it challenging to respond to accidents promptly. Hostile weather and the presence of sea ice make oil spills especially dangerous, as eliminating pollution in such conditions is extremely difficult. Additionally, bottom dredging associated with the development of port facilities for hydrocarbon projects is disruptive for habitats and ecological communities (Spiridonov et al., 2020).

The resilience of infrastructure and production facilities needs to be surveyed and monitored in order to reduce the risk of accidents due to climate change impacts, especially coastal degradation and thawing permafrost. Pipelines and tankers built on permafrost are becoming increasingly susceptible to soil expansion and recession, for example, increasing the risk of spills and other negative environmental impacts (McGee, 2020).

Lastly, decommissioning can have direct impacts on the seafloor and may introduce contaminants to the environment (Cordes et al., 2016).

Trends

A large share of the oil and gas reserves within the Arctic circle are expected to be located within Russia's territory. A U.S. Geological Survey assessment from 2008 estimates that over 60% of the total estimated Arctic petroleum reserves could potentially be discovered here (both offshore and on land) (Bird et al., 2008; Budzik, 2009; Figure 11).

According to the "Strategy for the Development of the Arctic Zone of the Russian Federation and National Security up to 2035", the share of Arctic oil in Russia's total oil production is planned to increase from 17.3% in 2018 to 23% in 2030, and 26% in 2035. The strategy also sets the goal of increasing the production of LNG in the Arctic territories to 64 million tonnes by 2030 and 91 million tonnes by 2035, which would make the Arctic region by far the greatest contributor to the total national LNG production (Russian Federation, 2020e). As evidenced by the strategy, the government sees the Arctic as a key resource for the country's global competitiveness in the future.

When it comes to the exploitation of offshore resources, experts assess that in the medium term, no new oil or gas production is feasible on the Russian Arctic shelf due to technological challenges, uncertainty concerning the resource potential, high costs, low oil prices, and unfavourable political conditions (Amiragyan, 2017; Poussenkova, 2020).

A small exploratory well on the Arctic shelf is estimated to cost about 1.5 times more than one in the Caspian Sea and 30-100 times more (depending on size) than an onshore well in Western Siberia. As just 10% of the Arctic shelf has been explored to date, both major discoveries and disappointments are anticipated (Poussenkova, 2020).

International sanctions imposed against Russia during the 2014 Ukrainian crisis also targeted deep-water and shale exploration and sharply limited the availability of necessary foreign technologies and equipment (Amiragyan, 2017; Poussenkova, 2020). The sanctions led to the suspension of the development of the Pobeda oil and gas field in the Kara Sea and the Shtokman gas field in the Barents Sea (Amiragyan, 2017; Poussenkova, 2020). As western partners pulled out of large Russian oil and gas projects, the Russian Government strengthened its ties to China, securing not only demand but also access to technologies and funds (Kotlyarov, 2019). It is unclear how this partnership will develop following the Russian invasion of Ukraine in 2022 and related sanctions. The EU is set to agree on an embargo on Russian oil, including a ban on shipping insurance for vessels transporting oil to third countries, which threatens to shrink export markets for Russian oil and gas (Staalesen, 2022).

In the longer term, given favourable economic and geopolitical conditions, production could commence at the Dolginskoye field in the Pechora Sea, where several wells were drilled in 2015 before production was postponed from 2021 to 2031 (Amiragyan, 2017). Other offshore projects in the Arctic are still at the initial stages of resource assessments, seismic surveys, and drilling of exploration wells.

4.4 Tourism

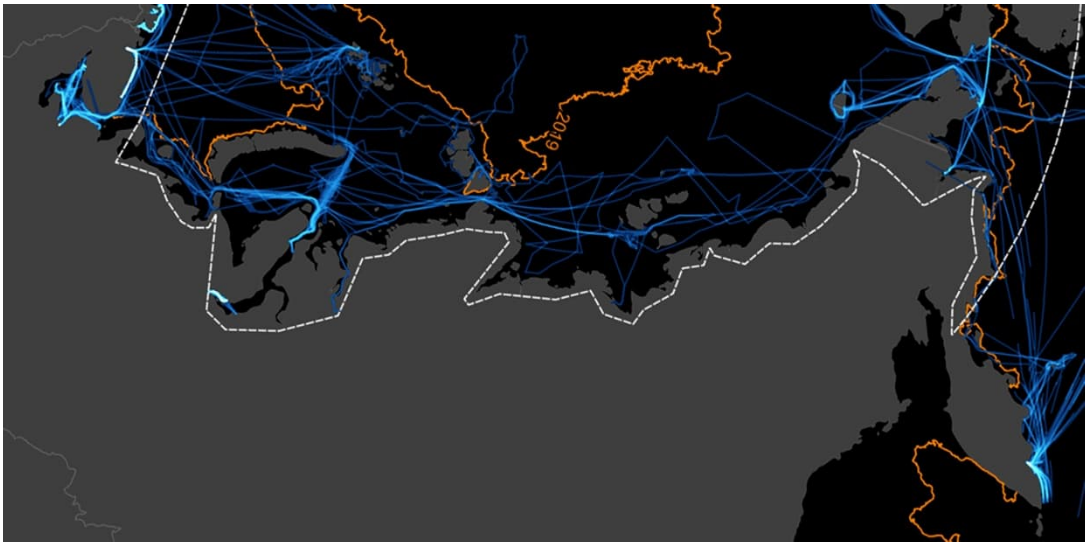

Figure 12: Routes of all tourism vessels in the Russian Arctic in 2019. Source: PAME (2021).

Quick Facts on Cruise Tourism in the Russian Arctic

- Number of cruise passengers (2019): 1,306 (visitors of Russian Arctic National Park only)[6]
- Main areas: Cruises to Franz Josef Land and Novaya Zemlya (both are parts of the Russian Arctic National Park) as well as to Wrangel Island, White Sea, Gulf of Ob, Chukchi Peninsula
- Summary & Trend: Currently comparatively little tourism activity. While interest in tourism activities is expected to rise, high costs and limited infrastructure require much investment

Socio-cultural and Economic Relevance

Tourism in the Russian Arctic began in 1966 with the first organised steam-ship cruise in the region aboard the vessel *Václav Vorovsky*. After the collapse of the Soviet Union in 1991, the Russian government showed no interest in developing Arctic tourism. Demand for tourist services in the Russian Arctic picked up as the decade progressed but declined in the wake of the 1998 financial crisis (Shaparov et al., 2019).

The Russian government has supported various efforts to develop in the Russian Arctic since the turn of the millennium (Lukina et al., 2020). Issued in 2014, the "Development Strategy of the Arctic Zone of the Russian Federation until 2020" emphasises tourism development as an important means of enhancing social-economic development across the zone. Specific measures proposed in the strategy include efforts to expand ecotourism, improved legal and regulatory support, the establishment of financial support based on public-private partnerships, the promotion of regional tourism clusters, and the promotion of Arctic tourism on the national and international levels (Grushenko, 2018). Likewise, the new "Strategy for the Development of the Arctic Zone of the Russian Federation and National

[6] Source: National Park Russian Arctic (2022)

Security up to 2035" stresses the importance of developing Arctic tourism.

The majority of tourist attractions in the Russian Arctic are natural objects such as glaciers, fjords, coastal cliffs, waterfalls, birds and marine mammals (Grushenko, 2018). Tourists predominantly travel by sea routes to visit these sites (Kuklina et al., 2017). The melting of sea ice has made the Arctic waters more accessible for cruise ships and navigation in summer (Grushenko, 2018).

In addition, the Russian Federation is the only country worldwide which offers tourist expeditions to the North Pole. The expeditions depart from Murmansk on state-owned icebreakers operated by Rosatomflot (Shaparov et al., 2019). In the summer of 2018, five cruises to the North Pole were conducted (Nilsen, 2018).

Despite the efforts made by the federal and regional governments to develop tourism in the Russian Arctic, activities in the region still fall behind the possibilities provided by the natural and geographical conditions as well as the existence of many historical and cultural sites (Lukina et al., 2020). Challenges for tourism development in the Russian Arctic include the high cost of tours, the lack of suitable infrastructure and the travel restrictions in place (border and customs control) (Grushenko, 2018). The short high season also constrains efforts to develop tourism further (Shaparov et al., 2019). These challenges are especially pressing in the Siberian zone, which is characterised by severe weather and climate conditions and has few ports and airports (Kuklina et al., 2017).

Main Areas

The level of tourism development differs greatly across the Russian Arctic (Figure 12). The European zone (including the Murmansk, Archangelsk, and Komi regions) has relatively developed infrastructure and connects with Scandinavian tourist routes (Kuklina et al., 2017).

The most popular tourist sites for cruises in the Russian Arctic are Franz Josef Land and Novaya Zemlya. The Russian Arctic National Park on Novaya Zemlya was founded in 2009 and is open for visitors during the summer period from June to September. It is the leading ecotourism destination in the Russian North and attracted 1,306 tourists in 2019, the majority of which came from the Russian Federation, China, and the United States (Ermolina et al., 2019; National Park Russian Arctic, 2022; Table 2).

Table 2: Sea cruises to the Russian Arctic National Park. Source: Russian Arctic National Park, 2022.

Year	2012	2013	2014	2015	2016	2017	2018	2019
Number of cruises	10	5	6	11	9	12	10	17
Number of tourists	1,005	639	738	1,225	954	1,142	1,079	1,306

Additional cruise destinations in the Russian Arctic include the shores of Kolguev Island in the Barents Sea, the Nenets temple and the Greenland walrus rookery on Vaygach Island between the Pechora Sea and the Kara Sea, as well as the UNESCO heritage site Wrangel Island between the Chukchi Sea and East Siberian Sea (Shaparov et al., 2019). Data on the number of visitors to Wrangel Island is not readily available. However, travel agencies operating on this route estimate that the island was attracting around 400 visitors annually by 2018 and over a thousand in 2019 (IA Chukotka, 2018, 2020).

Related Impacts

On a general note, the low level of tourism development in the Russian Arctic means that the tourism fleet is comparatively small, limiting the scale of associated impacts (Borch et al., 2016). Moreover, some of the income generated from entry fees for the Russian Arctic National Park has been invested in environmental projects and infrastructure development, including the removal of waste abandoned there from various Soviet economic, scientific and military activities (Grushenko, 2018).

However, experts suggest that a rapid expansion of tourism in the Russian Arctic could threaten the environmental integrity of the entire region. The range of potential hazards identified includes soil erosion, marine pollution, as well as harm to habitats and species (Ermolina et al., 2019). Research has shown that unregulated whale watching negatively impacted the number of newborn calves in gatherings of beluga whales off the Solovetsky Archipelago, for example (Spiridonov et al., 2012). In addition, an increase in the number of cruise vessels touring remote parts of the NSR and passing close to the ice ridge could heighten the risk of accidents (Borch et al., 2016).

Trends

The "Strategy for the Development of the Arctic Zone of the Russian Federation and National Security up to 2035" pays special attention to the development of tourism in the Arctic. It underlines the importance of developing relevant infrastructure and regional tourism clusters, improving legal and regulatory frameworks, establishing funding programmes to promote tourism, and supporting the development of ecotourism in Indigenous Peoples' areas (Russian Federation, 2020e).

In the Murmansk region, the proposed Liinakhamari Port will serve as a tourism and adventure hub. The project, which foresees the development of several high-standard hotels on an area of some 200 hectares on the coast of the Barents Sea, may become the biggest tourism and adventure hub in the Russian North. The proposal also includes infrastructure such as new roads, seaport facilities, runways for small aircraft, and facilities for adventure tourism (Staalesen, 2021).

Forecasts predict that cruise tourism will further increase in the Arctic zone of the Russian Federation in the coming years (Ermolina et al., 2019; Grushenko, 2018). Improved navigation conditions caused by sea ice decline, the simplification of logistics, an increase in tourist infrastructure on the Arctic islands as well as the creation of permanent border crossing points are expected to lead to an increase in cruise ship calls and visitors in the region. For example, visitor numbers for the Russian Arctic National Park are expected to reach 40,000–50,000 people a year in the future (Grushenko, 2018).

Arctic tourism is expected to be concentrated on the archipelagos of Svalbard and Franz Josef Land (Grushenko, 2018). The Chukchi Peninsula on the border of the Chukchi and Bering Seas is another possible tourism centre, especially between the settlements of Uelen and Provideniya (Spiridonov et al., 2020). Additionally, more tourist-related vessel traffic may be observed north of the Wrangel and New Siberian Islands, Severnaya Zemlya and Novaya Zemlya, and plans exist to link tourist attractions across the Russian and Norwegian Arctic regions through the development of a cruise line along the Tromso-Arkhangelsk-Solovetsky Archipelago route (Borch et al., 2016; Lamers & Pashkevich, 2018).

4.5 Emerging Activities

4.5.1 Renewable energy

The region has a strong potential for the development of various renewable energy sources, foremostly wind and solar power, but also plant biomass as well as wave and tidal power (Mitko, 2020). Currently only a small number of experimental onshore renewable energy projects exist. In 2016, the government of the Republic of Karelia and Chinese energy service provider Sinomec signed an agreement to co-operate on an offshore wind project in the White Sea (TASS, 2018). There has not been any official update on the project development since 2018 and its status is unclear.

4.5.2 Aquaculture

The aquaculture production in the Russian Federation is small when compared to capture fisheries but is steadily growing. Most aquaculture production takes place in freshwater (Figure 13). In 2013, the "Law on Aquaculture (Fish Farming) and Introduction of Amendments into Individual Bills of the Russian Federation" was approved, providing the first legal framework for aquaculture development in the Russian Federation (FAO, 2022).

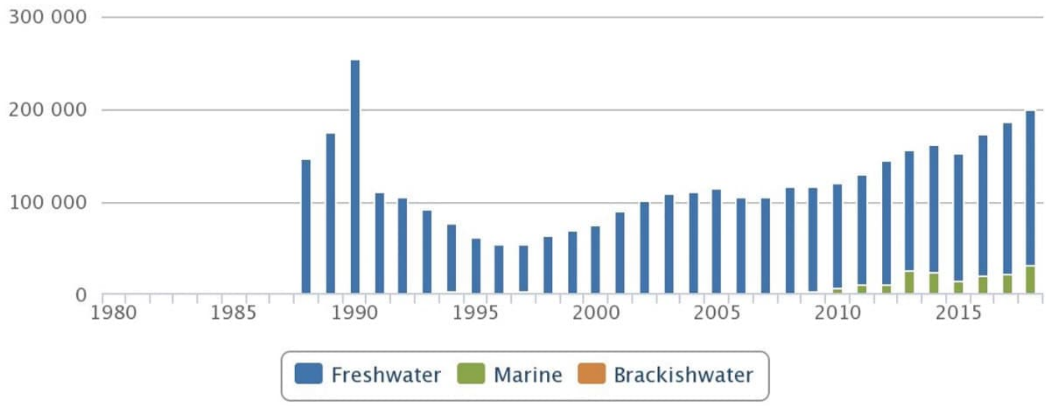

Figure 13: Aquaculture production in the Russian Federation in tonnes. Source: FAO FishStat (2020).

In the Russian Arctic, very limited marine aquaculture production exists in the Barents Sea and the White Sea, where Atlantic salmon and sea trout are farmed (Pauly et al, 2020). Given their climatic and geographic conditions, the western regions of Karelia, Murmansk and Arkhangelsk offer the most promising prospects for the development of marine aquaculture in the Russian Arctic (Undercurrent News, 2020). The federal government plans to introduce additional supporting measures to stimulate investment since the high initial price of sites is perceived to be one of the largest obstacles to the sector's growth (Stupachenko, 2020).

5 Governance of the Russian Arctic Marine Environment

A range of institutions and agreements were developed internationally, regionally, and nationally to regulate human activities and ensure the conservation and sustainable use of marine biodiversity. The institutions and agreements in place either holistically aim to contribute to the sustainable use and conservation of marine biodiversity, address specific sectors/pressures, or focus on specific marine species.

In this chapter, an overview of relevant national rules, regulations and procedures governing sea-based human activities as well as the establishment of conservation tools in the Russian Arctic, including marine protected areas (MPAs), will be provided.

Apart from these 'official' regulations, Indigenous management practices contribute to conservation outcomes. Arctic Indigenous People have been stewarding the land and sea for thousands of years, which has resulted in sustained biodiversity (Indigenous Circle of Experts, 2018). The contribution of such efforts to area-based conservation is oftentimes not considered, though, as governments may not recognise the efforts as formally designating protected areas, the areas may not meet national or international definitions; and/or those managing the area may not want it to be designated as a protected area (PAME, 2017).

The main international and regional agreements and frameworks with implication for the conservation and sustainable use of marine biodiversity in Russian Arctic waters, while highly relevant, are only briefly mentioned in this report, where relevant, and are explained in further detail in the regional overview report published as part of this series.

Main International and Regional Agreements and Frameworks

The conservation and sustainable use of marine biodiversity in Russian waters is based on the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which is complemented by other instruments, frameworks and agreements, such as those established under the Convention on Biological Diversity (CBD), the Food and Agriculture Organization of the United Nations (FAO), the International Maritime Organization (IMO), the United Nations Environment Programme (UNEP), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), the UNESCO World Heritage Convention, and the International Whaling Commission (IWC). In addition, regional mechanisms and agreements, such as the Arctic Council, and several regional fisheries bodies affect the conservation and sustainable use of marine biodiversity in Russian waters.

The Arctic Council is the only Arctic-specific forum for cooperation between the governments of the eight Arctic states (Canada, Denmark (by virtue of Greenland), Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States) and representatives of Arctic Indigenous Peoples. The Arctic Council promotes sustainable development and environmental protection in the Arctic by providing assessments and recommendations. At the time of writing this report, work within the Arctic Council was suspended indefinitely by the Arctic countries due to the Russian invasion of Ukraine, leading to uncertainties about the future of circumpolar cooperation (Dickie & Gardner, 2022).

In the Bering Sea and the Barents Sea, Russia cooperates with the United States and Norway respectively regarding matters relating to fisheries, maritime safety, and environmental stewardship (Pincus, 2020).

Also, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) covers a small part of the Russian Arctic waters in the Barents Sea and the White Sea within its 'Region I' (OSPAR, 2022). The rules and recommendations developed under OSPAR do not apply in these areas, however, as the Russian Federation is not a party to OSPAR.

Main National Rules, Regulations and Procedures

The "Strategy for the Development of the Arctic Zone of the Russian Federation and National Security up to 2035" identifies environmental protection and ecological integrity as national priorities. The strategy specifies a number of key mechanisms for environmental protection in the region, including the designation of specially protected natural areas, elimination of accumulated damage and waste, development of a holistic monitoring system, research funding, the regular assessment of anthropogenic impacts, mitigation of the negative impacts of natural resource exploitation as well as the development of a system of oil and petroleum spill prevention and response (Russian Federation, 2020e).

Reorganised in 2019, the Ministry for the Development of the Far East and the Arctic is the main governmental body responsible for coordinating the implementation of the State Programmes and the management of federal property in the Arctic. However, the Ministry is not responsible for MPAs and other specially protected natural areas of federal status.

The Russian constitution grants Indigenous communities special rights. The "Federal Law on Guarantees of the Rights of the Indigenous Small-Numbered Peoples of the Russian Federation" (1999), for example, grants Indigenous communities a range of rights with regard to the protection of their environment, traditional ways of life, and economic activities (Russian Federation, 2014b). In practice, however, Indigenous Peoples in the Russian Federation have very little influence on decision-making relating to regional development issues, including the creation and governance of natural protected areas (Garipov, 2014; Hoel, 2009).

Indigenous Peoples seeking to exercise their rights must overcome a variety of obstacles, including a lack of adequate specification in relevant legislation, inconsistencies in legislation, and the lack of enforcement of existing legislation by local authorities. Furthermore, the courts tend to reject the claims of communities concerning the rights to establish territories of traditional natural resource use of federal significance (only those can include marine areas), restrict the ability of communities to carry out entrepreneurial activities, and in some cases qualify traditional hunting and fishing as poaching (Garipov, 2014; Kryazhkov, 2019). In addition, Russian conservation law does not require that the traditional knowledge of Indigenous Peoples be considered in the planning of development / infrastructure projects that will affect their lands, waters, and ways of life (Russian Federation, 2014b).

Research on Arctic biodiversity is performed mainly by state-funded academic institutions, above all, by the institutes of the Russian Academy of Sciences. The Arctic and Antarctic Research Institute (AARI) is the oldest and largest Russian research institution in the field of Polar research. Its main areas of study are hydrometeorology and environmental dynamics in the Arctic and Antarctic, but it also contributes to projects related to biodiversity. The institute has its own fleet of research vessels. Since 1937, research facilities seasonally deployed on drifting ice, so-called 'drift stations', have been used by the institute in addition to a network of standing research stations. However, this practice was suspended in 2014 due to the increased risks posed by changed climatic conditions (AARI, 2020). In addition, several gas and oil corporations engage in research in the Russian Arctic.

5.1 Marine Protected Areas and Other Effective Area-based Conservation Measures

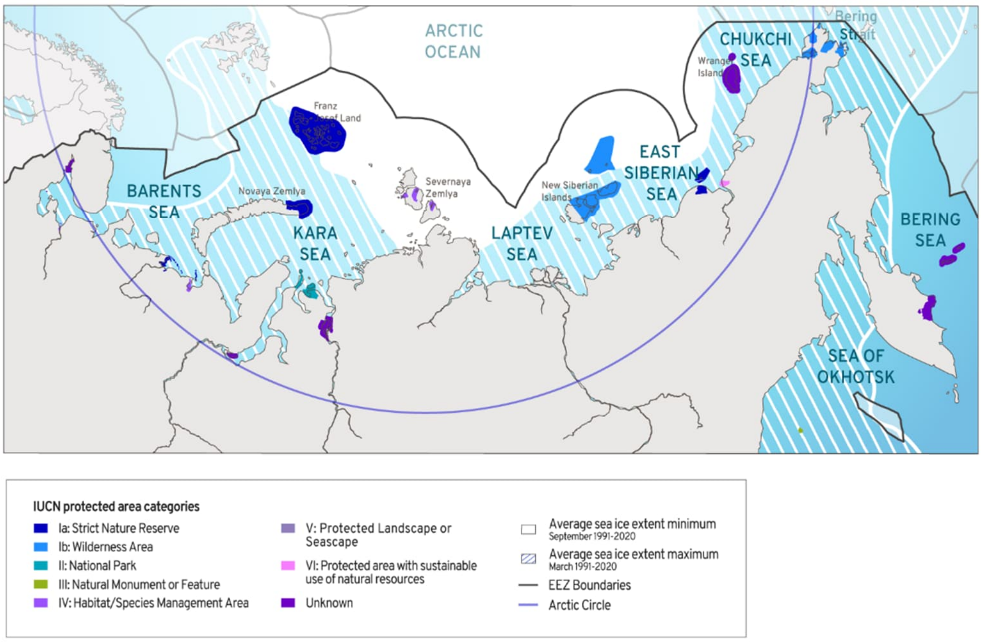

Figure 14: Map of marine protected areas in the Russian Federation. IASS visualisation based on Copernicus Climate Change Service/ECMWF (2021a, 2021b), Flanders Marine Institute (2019), GRID-Arendal (2019), UNEP-WCMC and IUCN (2022).

Quick Facts on Marine Protected Areas in the Russian Arctic[7]

- Percentage of total Russian marine area designated as Arctic MPAs: 2.36%
- Protected area at sea: 187,730 km²
- Amount of implemented MPAs: 18
- Proposed MPAs: 1

Protected areas in the Russian Arctic have been established largely on an ad hoc basis, with a particular focus on terrestrial and freshwater ecosystems (Spiridonov et al., 2012). Most of the existing marine protected areas are attached to coastal or island protected areas and act as marine compartments or buffer zones (Spiridonov et al., 2012b, 2020; Figure 14; Annex 3).
According to Russian legislation, all sea areas, including internal marine waters, territorial seas, and EEZ are under federal jurisdiction. Therefore, protected areas that encompass or include marine zones can only be established at the higher administrative level and must have federal status (unlike terrestrial and freshwater protection that can also be designated on the regional level). The designation and functioning of protected areas are regulated by the “Federal Law on Specially Protected Areas” from

[7] Own calculation based on Annex 3, Table 6.

1995 and its amendment from 2018 as well as the “Federal Law on Environmental Protection”.

The executive body responsible for the establishment, management, and protection of MPAs is the Ministry of Natural Resources and Environment. The ministry is responsible for the creation and enforcement of policies and regulations dealing with the environment, including conservation, regeneration, forestry and wildlife protection, as well as the licensing and monitoring of the exploration of natural resources (Russian Federation, 2015). The direct management of MPAs is carried out by specially appointed Federal State Budget Institutions, which are subordinate to the Ministry of Natural Resources and Environment. It is worth noting, that Federal State Budget Institutions in charge of protected areas that encompass both terrestrial and marine areas often focus their management and control efforts on the more accessible terrestrial part as they lack the funding, qualified staff and technical facilities necessary to study, monitor, and control the marine territories that fall under their authority (Spiridonov et al., 2012).

Guidelines for the development of protected areas in the Russian Federation were defined in “Concept for the Development of a System of Specially Protected Natural Territories of Federal Significance for the Period Until 2020”. The main aim defined in the document was to enhance the development of protected natural areas by increasing the efficiency of federal management, safeguarding environmental integrity, protecting biological and landscape diversity, and ensuring the conservation and sustainable use of natural and cultural heritage. The new “Strategy for the Development of the System of Specially Protected Natural Territories of the Russian Federation for the Period up to 2030” is in development (Ministry of Natural Resources and the Environment, 2021).

Up to now, 18 marine and coastal specially protected natural areas have been designated in the Russian Arctic (Figure 14, Annex 3, Table 6). Many of protected areas include areas of high importance for the functioning of the wider Arctic marine ecosystems, such as frontal zones, upwelling systems, and polynyas (Spiridonov et al., 2012, 2020).

Among the 18 protected areas, eight are strictly protected nature reserves (*zapovednik*). The Wrangel Island Reserve is of special significance for marine biodiversity protection as it supports exceptionally high levels of unique biodiversity and is home to the world’s largest population of Pacific walrus and the highest density of ancestral polar bear dens (UNESCO, 2004). It is also a nesting area for more than 50 migratory bird species, including many endangered species, and a major feeding ground for gray whales (UNESCO, 2004).

National parks enjoy a lower level of protection than the strictly protected *zapovedniks* and are generally larger. The biggest protected area in the region is the Russian Arctic National Park, which was established in 2009. The park spans 8.8 million hectares and comprises the northernmost part of Novaya Zemlya Archipelago, Franz Josef Land Archipelago, and marine areas within 12 nautical miles from the coastlines. The Beringia National Park forms part of the Shared Beringian Heritage Programme, which was established to promote conservation and enable connections between people and communities across the Bering Strait. Legislation to formally establish the Beringian Heritage International Park was proposed in 1990 but did not pass the United States Congress. Since 2014, there has been little contact between the US and Russian governments on this issue in response to Russian actions in Ukraine (Pincus, 2020).

In addition to the strictly protected *zapovedniks* and national parks, several federal natural sanctuaries (*zakaznik*) in the region include marine areas (Spiridonov et al., 2012).

An additional category managed at the regional level was recently scrapped. These Marine Mammal Protection Areas included rookeries, haul-out sites, and coastal zones and were regulated through the “Soviet Order on Rules for Protection and Fisheries of Marine Mammals” (1986), which was revoked in July 2020 as a part of a large package of regulations that were declared to be outdated (Russian Federation, 2020d). The federal government argued that the law imposed unnecessary constraints and inflicted economic losses on the fishing industry (vessels were prohibited from operating in or even entering designated areas under the law) (Fishnews, 2020b).

The WWF study “Systematic Conservation Planning for the Russian Arctic Seas” identified conservation priority areas in Russian waters based on their value for the health of Arctic ecosystems. Notably, many of the existing protected areas overlap with the areas identified in the study, but their main drawback is a significant lack of spatial coverage (Spiridonov et al., 2020; Figure 15).

Several of the areas highlighted by WWF were also previously identified as IUCN areas as sites that could potentially qualify for World Heritage status. This includes the Bering Strait Ecoregion, the High Arctic Archipelagos, and the Great Siberian Polynya (IUCN, 2017).

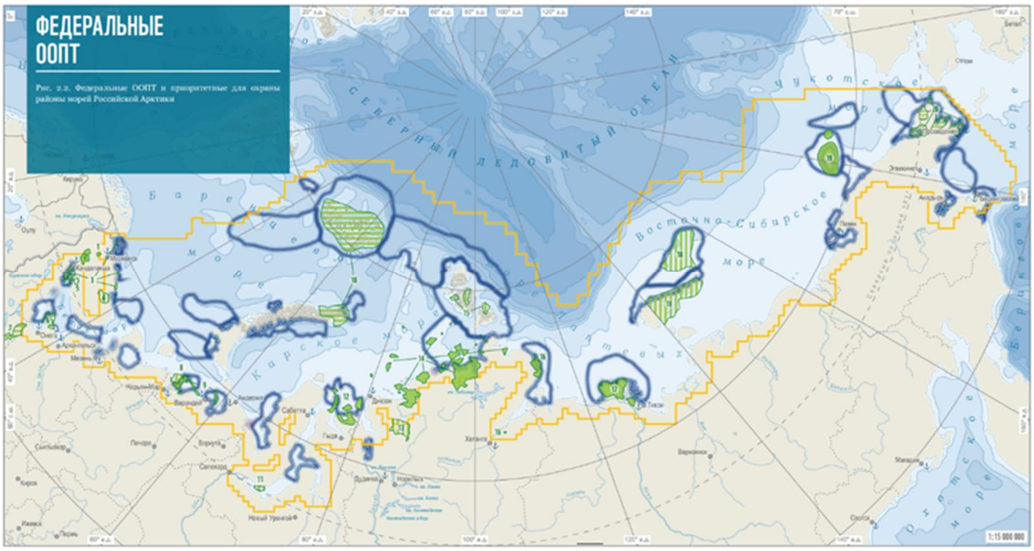

Figure 15: Map indicating Marine Protected Areas (green) and conservation priority areas (blue borders) in Russian Arctic waters. Source: Spiridonov et al., 2020.

While some progress has been made with regards to nature conservation in Russia, the country’s environmental policies remain ambivalent, with relevant institutions lacking adequate funding and enforcement capacities. On occasion, efforts even fall victim to economic or political interests. Several protected areas in the Russian Arctic have been the subject of controversy in recent years. In July 2019, for example, the buffer zone of Meduza Bay, which is part of the strictly protected Great Arctic Reserve, was almost halved by the Ministry of Natural Resources and the Environment to clear the way for the development of an open-cast coal mine operated by Russian company Vostokugol (Peter, 2019; Ministry of Natural Resources and the Environment, 2019). In 2016, Franz Josef Land Sanctuary was incorporated into the Russian Arctic National Park. This increased the level of protection, but at the same time, effectively reduced the total area of the former sanctuary as parts of its maritime areas lost their protected status. Greenpeace Russia attempted to challenge the sanctuary’s reorganisation, but the lawsuit was dismissed by the Russian Supreme Court. Greenpeace also pointed out that part of the former marine area of the sanctuary intersected with a designated offshore area for mineral exploration and mining, allocated to the oil company Rosneft (RBC, 2017).

5.2 Sector-based Regulations

5.2.1 Shipping

The main legislation governing maritime transport in the NSR waters is the "Federal Law On Amendments to Certain Legislative Acts of the Russian Federation Concerning State Regulation of Merchant Shipping on the Water Area of the Northern Sea Route", which defines the NSR as extending from the Novaya Zemlya Archipelago in the west to the maritime boundary with the United States in the east. The Barents Sea is not formally recognised as a part of the NSR under this legislation as it does not conform with the definition of a freezing sea under relevant international law (see Polar Code below). Discussions within the government continue regarding the possible extension of the NSR regime to the other Arctic Seas or the development of additional specific regulations for them (Vedeneeva, 2020).

The "Rules of Navigation in the Water Area of the Northern Sea Route" regulate navigation procedures in NSR waters. They establish the rules for piloting vessels in icy waters and for icebreaker support, set up requirements regarding insurance, navigational safety, environmental protection from pollution, and radio communication, and ensure hydrographic and hydrometeorological support (Russian Federation, 2020a).

Since 2018, two governmental bodies have been tasked with managing the development of the NSR under the so-called 'two keys principle': the normative regulation of shipping on the NSR is supervised by the Ministry of Transport, while state corporation Rosatom is responsible for the development of relevant infrastructure and the organization and of safe maritime traffic on the NSR (Arcticway, 2022).

The Northern Sea Route Administration within the Federal Marine and River Transport Agency (Rosmorrechflot) of the Ministry of Transport administers navigation permits (vessel may not enter NSR waters without a permit) and ice pilotage certificates (Russian Federation, 2012).

The Marine Operations Headquarters, which was established in 2020 within the Atomflot (part of the Rosatom group operating the nuclear icebreaker fleet), is responsible for icebreaker assistance, as well as for monitoring vessels' location and movement within the NSR (Russian Federation, 2020a).

The safety of navigation in Russian marine waters is regulated by the "Federal Law on Transport Safety". The search and rescue operations system is based on cooperation across a range of ministries, including the Ministry of Transport, Ministry for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM), Ministry of Defence, and Ministry of Natural Resources and Ecology, among others. Rescue operations are led by EMERCOM. Ten new rescue centres are to be established: six of these are already operational, with four more planned for the Eastern Arctic. These stations are located in Murmansk, Arkhangelsk, Naryan-Mar, Vorkuta, Nadym, Dudinka, Tiksi, Pevek, Provideniya, and Anadyr. In addition to this, the regional meteorological monitoring system will be overhauled and modernised to ensure the safety of maritime and other activities in the Arctic (Ministry for the Development of the Russian Far East and Arctic, 2020b).

On the regional level, cooperation in the management of maritime activities and spill response is managed through the Joint Norwegian-Russian Commission on Environmental Protection in the Barents Sea and the recently renewed Joint Contingency Plan (JCP) with the United States for pollution response in the Bering and Chukchi Seas (Norsk Polarinstitutt, 2022; The U.S. Coast Guard, 2021).

International treaties and instruments with relevance to shipping activities in Russian waters were principally established under the IMO. The IMO is responsible for developing international standards for ship safety and security and for the protection of the marine environment and the atmosphere from harmful shipping impacts. To fulfil this mandate, the IMO has adopted several international agreements and a wide range of measures to prevent and control pollution by ships and to mitigate the possible effects of maritime operations and accidents (IMO, 2021a).

Two key conventions adopted under the IMO are the International Convention for the Safety of Life at Sea (SOLAS), which lays down rules on navigation and safety, and the International Convention for the Prevention of Pollution from Ships (MARPOL), which establishes regulations to prevent pollution by oil and other hazardous substances resulting both from accidental pollution and routine operations (IMO, 2021b, 2021c). The International Code for Ships Operating in Polar Waters (Polar Code) is mandatory under both SOLAS and MARPOL and pertains to passenger and cargo ships of 500 gross tonnes or more operating in polar areas. The Polar Code includes mandatory as well as recommended measures regarding safety and pollution prevention, including the recommendation not to use or carry heavy fuel oil in the Arctic (IMO, 2021d).

On that point, an amendment to MARPOL Annex I was approved in 2021, prohibiting the use and carriage of heavy fuel oil for use as fuel in Arctic waters from 1 July 2024. Exemptions were established, inter alia, for vessels engaged in securing the safety of ships, search and rescue operations, and oil spill preparedness and response activities. In addition, MARPOL parties with a coastline bordering Arctic waters can exempt their vessels when operating in their waters until 1 July 2029 (IMO, 2021e).

In addition, Russia and the United States jointly submitted a proposal to establish two-way routing measures and precautionary areas in the Bering Strait to the International Maritime Organization (IMO) in 2017 (Pincus, 2020).

Regionally, guidelines and assessments with regard to shipping were, for instance, developed under the Arctic Council. In addition, the Arctic Council has served as a basis for exchange by the Arctic states on legally binding regional governance instruments on Aeronautical and Maritime Search and Rescue (2011) and Marine Oil Pollution Preparedness and Response (2013) (Østhagen et al., 2022).

5.2.2 Fishing and Hunting

Regulations Pertaining to Fishing

The "Federal Law on Fishery and Protection of Aquatic Biological Resources" from 2004 and its numerous amendments are the general framework for the regulation of fisheries in the Russian Federation. The law outlines specific rules and regulations for industrial, recreational, and subsistence fishery, as well as a special fishery for scientific, educational and replenishment purposes. It also contains a provision to designate fish conservation and fishery refuge zones, which not only restrict fishing but also other economic activities that could be harmful to aquatic biological resources.

The main body responsible for fisheries policy, management, and control is the Federal Agency for Fishery (Rosrybolovstvo) established in 2008 under the federal government (Russian Federation, 2008). Regulations established by the federal government are adapted by regional authorities to suit local conditions (Ksenofontov et al., 2017). Their enforcement is coordinated by the Border Service (*Pogranichnaya Sluzhba*, PS) (FAO, 2022). The Institute of Fisheries and Oceanography (VNIRO), based in Moscow, coordinates fisheries research in the Russian Federation. All regional research institutes are subordinated to VNIRO (FAO, 2007).

Associations of fishing enterprises publicly represent the interests of the fishery industry. Generally, every coastal region with a developed fishing industry has one or more regional associations, which take a lead in public debates on governmental initiatives thought to limit fishing industry interests and in promoting measures and regulations to protect fisheries resources. These regional associations are complemented by industry associations for specific fisheries, such as the Association of Alaska Pollack Fishers, the Association of the Shrimp Catchers of the Far East, or the Association of the Crab Catchers of the North (FAO, 2007).

All fisheries are regulated by so-called 'Fishing Rules', which specify overall quotas, spatial and temporal closures, restrictions related to the type, quantity and size of fishing gear as well as minimum allowable catch size and allowable bycatch. The Fishing Rules are set regionally for Russia's major sea areas: the Western Basin, the Northern Basin, the Arctic Ocean Basin, the Far East Basin, the Black Sea – Azov Sea Basin, and the Caspian Basin. In order to engage in industrial fishery, a share in the total allowable catch (TAC) for particular stocks is necessary. The shares are set annually by the Russian government and are distributed to stakeholders based on historical records (FAO, 2007). The TACs have been rather stable for most species in the past (Eynde, 2017). Indigenous fishers can use the catch only for local consumption and are not allowed to sell it (FAO, 2007).

From 2017, investment quotas were introduced to promote investments in fishing vessels or fish processing. Under this mechanism, fishing companies that build new vessels and processing facilities in Russia are granted additional fishing rights for specific species (15% for the construction of a new vessel, 5% for the development of new processing facilities) (Eynde, 2017).

In the Barents Sea, fish stocks are managed in accordance with the 2010 "Treaty between the Kingdom of Norway and the Russian Federation Concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean". According to the Treaty, TACs, mutual quotas of catches, and other regulatory measures for fishing are to be negotiated within the Joint Norwegian-Russian Fisheries Commission (JNRFC). The parties of the JNRFC meet annually to agree on technical aspects and procedures as well as to set the TACs for the major shared stocks and to allocate the quota among Norway, the Russian Federation and third parties (the EU, Iceland, Greenland and the Faeroe Islands). So far, TACs have been established for Northeast Arctic cod, haddock, Barents Sea caplin, Greenland halibut, and beaked redfish based on recommendations by ICES. Efforts undertaken by the JNRFC to eliminate overfishing and illegal, unreported and unregulated fishing have been vital in improving the state of the Northeast Arctic cod within its jurisdiction (Norwegian Ministry of Climate and Environment, 2017).

The management of wild salmon stocks in Russian waters is based on the management principles adopted by the North Atlantic Salmon Conservation Organization (NASCO). Under the Convention, which aims to aims to conserve, restore, and manage the species, targeted fisheries for Atlantic salmon are prohibited in most areas of the North Atlantic beyond 12 nautical miles from the coast. This creates a large area which is free of directed salmon fisheries (NASCO, 2021).

Regulations Pertaining to Hunting

Hunting is regulated by the Russian Ministry of Natural Resources and Environment and controlled by the Special Marine Inspection of the State Border Guard Service. Scientific information for decisions related to hunting is collected by the Federal Fisheries Agency (IWC, 2022a). In addition, the Russian Federation receives management advice from IWC, ICES and the joint US-Russia Polar Bear Commission with regards to the hunting of specific marine mammals (Table 3).

Table 3. Overview of management advice per marine mammal species.

Species	Adviser
Hooded seal	ICES
Harp seal	ICES
Bowhead whale	IWC
Gray whale	IWC
Polar bear	Joint U.S.-Russia Polar Bear Commission

By law, only Indigenous Peoples are permitted to hunt large whales in Russia. When doing so, they must observe a number of regulations related to catch/strike limits, hunting methods, training and reporting. Wildlife officers control local whaling and hunting activities and provide related information to the local government (IWC, 2022a).

Polar bear hunting was officially banned in the Russian Federation in 1956, with no exceptions made for Indigenous People of the Chukchi Peninsula (Priemskaya, 2019). In 2000, Indigenous people and government representatives of the United States and the Russian Federation signed a treaty to coordinate the management of the shared Alaska-Chukotka polar bear population. In 2007, a joint U.S.-Russia Commission was established and tasked with supervising the management of polar bear populations in the region. The commission establishes upper limits on polar bear harvests from the Alaska-Chukotka polar bear population on the basis of recommendations of the scientific working group. The harvest limit is evenly split among the Indigenous People of Alaska and Chukotka. However, a ban on polar bear harvesting in Chukotka that was imposed by the Russian government remains in place (U.S.-Russia Polar Bear Commission, 2019).

5.2.3 Offshore Oil and Gas Exploration

All of the country's mineral resources are owned by the state independently from land property rights and are administered through a system of licences issued by the Ministry of Natural Resources and Environment, or, more specifically, by the Federal Agency for Subsoil Use, which is subordinate to the former and responsible, inter alia, for the regulation of oil and gas extraction (Russian Federation, 1992, 2004).

The Ministry of Energy is responsible for the development and implementation of policies and regulations for the fuels and energy industry. The Federal Environmental, Industrial and Nuclear Supervision Service is the key regulator of technical issues in the development of natural resources and is responsible for the control and supervision of industrial safety. Additionally, the Federal Service for Supervision of Nature Use monitors compliance with legislation and takes enforcement actions when subsoil use and environmental regulations are violated (Russian Government, 2022a, 2022b, 2022c).

The Ministry of Transport and its subordinate federal agencies are responsible for the coordination of oil spill response at sea. They ensure preparedness and supervise the oil spill response system. In July 2020, the "Federal Law on Amendments to Article 46 of the Federal Law on Environmental Protection and Certain Legislative Acts of the Russian Federation" was adopted following a massive oil spill in

Norilsk (see details BBC News, 2020). It strengthens requirements for extracting companies with respect to their responsibilities around spill prevention and response, including the development of contingency plans and financial responsibility planning, as well as funding for rehabilitation work and compensations of damages to the environment and to, the life, health, and property of citizens and legal entities.

According to the “Federal Law on State Support of Entrepreneurial Activity in the Arctic Zone of the Russian Federation”, an impact assessment must be prepared ahead of capital construction projects (including drilling) in the Arctic. However, corporations have been lobbying the Ministry of Natural Resources to scrap this requirement for drilling wells. In 2021 the Ministry announced plans to amend the legislative norms, but no further developments have followed thus far (RBC, 2021).

The “Energy Strategy of Russia up to 2035” identifies the fuel and energy complex as a central pillar of the Russian economy in the coming decade. The stated goals of diversifying exports, in particular by increasing LNG production, as well as modernising and developing new infrastructure, are especially relevant to the Arctic. The state heavily supports the oil and gas industry to this end, primarily by granting partial or full exemptions from the federal extraction tax and export duty incentives (Amiragyan, 2017).

International and regional governance frameworks which influence the applicable Russian rules and regulations for offshore oil and gas activities include the work of the Arctic Council. Under the Arctic Council, guidelines as well as several other soft-law instruments with relevance to offshore oil and gas activities in the Arctic were developed. In addition, the previously mentioned legally binding regional governance instruments on Aeronautical and Maritime Search and Rescue (2011) and Marine Oil Pollution Preparedness and Response (2013) are also relevant to offshore oil and gas exploration and exploitation in the Arctic (Østhagen et al., 2022). Norway and the Russian Federation furthermore signed a bilateral agreement on combating oil spills in the Barents Sea in 1994. Under the agreement, both nations drafted a joint contingency plan and conduct annual joint exercises (Norwegian Ministry of Climate and Environment, 2016).

5.2.4 Tourism

Federal Law No. 132-FZ dated 11/24/1996 “On Principles of Tourism Activities in the Russian Federation” (updated 1 January, 2019) and the state programme “Development of Culture and Tourism” for 2013-2020 lay the basis for regulating tourism activities in the Russian Federation. The Ministry of Economic Development is responsible for the legal regulation in the field of tourism and tourist activities (Ermolina et al., 2019).

The Ministry for the Development of the Far East and the Arctic, together with the Federal Agency for Tourism (Rostourism), is developing proposals for legislative measures that would boost tourism in the Far Eastern and Arctic territories. The draft proposal includes measures concerning the improvement of transport accessibility for each of the Arctic regions, the development of cruise tourism, incentives for business and investment, as well as easing access for foreign tourists (Ministry for the Development of the Far East and the Arctic, 2020a). In April 2021, the Government passed a programme of state support for the traditional economic activities of Indigenous Peoples in the Arctic. The programme also includes measures to support the development of the tourism industry in the region (Russian Federation, 2021a).

Despite these recent efforts, regulations on environmental impact assessments and environmental and safety standards for Arctic tourism (similar to those developed for Antarctic tourism) are lacking (Spiridonov et al., 2012a).

6 Annex 1

Table 4. Marine mammal species present in Russian waters and their IUCN Red List categories. Source: IUCN, 2022.

Common Name	Scientific Name	Red List Category	Assessment	Arctic
Sei Whale	Balaenoptera borealis	Endangered	2018-06-25	
Blue Whale	Balaenoptera musculus	Endangered	2018-03-16	Present
Sea Otter	Enhydra lutris	Endangered	2020-01-21	
North Pacific Right Whale	Eubalaena japonica	Endangered	2017-12-19	
Mediterranean Monk Seal	Monachus monachus	Endangered	2015-07-16	
Fin Whale	Balaenoptera physalus	Vulnerable	2018-02-04	Present
Northern Fur Seal	Callorhinus ursinus	Vulnerable	2015-03-26	
Hooded Seal	Cystophora cristata	Vulnerable	2015-06-07	
Walrus	Odobenus rosmarus	Vulnerable	2016-02-05	Present
Sperm Whale	Physeter macrocephalus	Vulnerable	2008-06-30	
Polar Bear	Ursus maritimus	Vulnerable	2015-08-27	Present
Sato's Beaked Whale	Berardius minimus	Near Threatened	2020-08-23	
Steller Sea Lion	Eumetopias jubatus	Near Threatened	2016-02-04	
Stejneger's Beaked Whale	Mesoplodon stejnegeri	Near Threatened	2020-08-23	
False Killer Whale	Pseudorca crassidens	Near Threatened	2018-07-23	
Bowhead Whale	Balaena mysticetus	Least Concern	2018-01-01	Present
Common Minke Whale	Balaenoptera acutorostrata	Least Concern	2018-03-16	Present
Beluga Whale	Delphinapterus leucas	Least Concern	2017-06-22	Present
Common Dolphin	Delphinus delphis	Least Concern	2020-10-20	
Bearded Seal	Erignathus barbatus	Least Concern	2016-02-17	Present
Gray Whale	Eschrichtius robustus	Least Concern	2017-12-30	Present
Short-finned Pilot Whale	Globicephala macrorhynchus	Least Concern	2018-06-18	
Risso's Dolphin	Grampus griseus	Least Concern	2018-02-21	
Gry Seal	Halichoerus grypus	Least Concern	2016-03-01	
Ribbon Seal	Histriophoca fasciata	Least Concern	2015-06-09	Present
Pygmy Sperm Whale	Kogia breviceps	Least Concern	2019-10-11	
Dwarf Sperm Whale	Kogia sima	Least Concern	2020-02-13	
Atlantic White-sided Dolphin	Lagenorhynchus acutus	Least Concern	2019-04-01	

Retrieved from IUCN using the following search query:

- Type: Species
- Taxonomy: Animalia -> Chordata -> Mammalia
- Land Regions: Europe -> Russian Federation
- Habitats: 10. Marine Oceanic
- *Marine Regions: Arctic Sea (only for the data in the last column ‘Arctic Sea’)

Source: IUCN. (2022). IUCN red list of threatened species. www.iucnredlist.org (Accessed: 13.07.2022)

7 Annex 2

Table 5. Reported catch of selected marine mammals by the Russian Federation from 2016 to 2019, number of individuals. Sources: IWC (2022b), Federal Agency for Fishery (2018 2019, 2020).

	2016	2017	2018	2019
Gray whale	120	119	107	137
Bowhead whale	2	1		1
Tooth whales (minke whales), dolphins (Chukchi Sea)		3		
Pinnipeds (Bering, Chukchi, and White Seas)	740	1513	697	379

8 Annex 3

Table 6. Marine and coastal specially protected natural areas in the Russian Arctic.[8]

	Name	International status	Sea	Area on land (ha)	Area at sea (ha)	Marine buffer zone (ha)	Year of establishment
Zapovedniks and National parks (category I or II IUCN)							
1	Beringia		Chukchi, Bering	1,300,120	332,180	0	1993 (reorganised in 2013)
2	Great Arctic		Kara,	3,188,288	980,934	0	1993
3	Gydanskiy		Kara	878,174	0	60,000	1996 (reorganised in 2019)
4	Kandalakshskiy	RW	Barents,	20,947	49,583	0	1932
5	Koryakskiy	RW	Bering	244,156	83,000	0	1995
6	Nenetskiy		Barents	131,500	181,900	242,800	1997
7	Bear Islands (Medvezhyi Ostrova)		East Siberian	347,611	467,957	0	2020
8	Taymyrskiy	BR	Laptev	1,744,910	37,018	0	1979
9	Ust'-Lenskiy		Laptev	1,433,000	0	1.050,000	1985
10	Wrangel Island	WH	Chukchi, East	795,650	1,430,000	3.240,000	1976
11	Komandorskiy		Bering	185,379	3,463,300	0	1993
12	Kronotskiy	BR; WH	Bering	1,007,134	135,000	0	1934
13	Russian Arctic (Russkaya Arktika), incl. Franz Josef Land Archipelago (latter protected since 1994)		Barents, Kara	1,426,000	6,544,067	0	2009 (reorganised in 2016)
Zakazniks, or Natural Sanctuaries (category IV-V IUCN)							
14	Nenetskiy	RW	Barents	188,500	120,000	0	1985
15	Nizhne-Obskiy*	RW	Kara	128,000	0	0	1985
16	Severozemelskiy		Kara, Laptev	367,771	53,930	0	1996

[8] International status: RW — Wetland of International Importance (Ramsar site); BR — UNESCO Biosphere Reserve; WH — UNESCO World Heritage site. Adapted from WWF Russia (2011). Size data are mainly from Potapova et al. (2006), updated and complemented with the data from AARI (2022) and legislative documents

* While this site does not have a protected marine area, it protects an important coastal area for Arctic birds and was thus included in the cited sources.

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