

Executive summary

Occupying just 5% of the area covered by the world's oceans, and just 1.5% of their volume, the Arctic Ocean and its adjacent seas have a pronounced effect on the state of the Earth's climate and play a decisive role in many global processes. Arctic seas regulate the global carbon cycle, because they are an important CO₂ source in the winter and a sink for the flux of CO₂ in the summer. Recent assessments have shown that the Arctic is critically important in atmospheric CO₂ removal, both now and in the future.

Arctic seas have a profound impact on many large-scale oceanographic processes; they are a zone of deep ocean water formation, and determine to a great extent the global hydrological cycle on our planet as well as atmospheric heat absorption.

The Russian sector of the Arctic occupies a large part of the Russian Federation, extending as far as about 11 000 km from the Norwegian border on its western boundary to the Mys Dezhneva (East Cape) on the eastern one. It includes Murmansk Oblast, Nenets AD, Yamalo-Nenets and Taimyr (Dolgano-Nenets) AD, coastal Arctic uluses (small administrative units at the Arctic coast including several villages) of the Sakha Republic (Yakutia), Chukotka (Dolgano-Nenets) AD. The Russian sector of the Arctic covers about 9.46 million km², of which the Arctic seas cover 6.8 million km², or 45% of the Arctic Ocean overall. As much as 70% of the area is permanently covered by ice.

This report is about the GIWA region 1a, further referred to as the Russian Arctic, and considers only the central and eastern parts of the Russian section of the Arctic. The western/European part (the Barents Sea and White Sea) is evaluated in the GIWA Regional Assessment 11. However, because water and atmospheric transports from the western/European of the ocean exert a significant influence on the condition of the transboundary waters in region 1a, information from the Barents Sea region is provided as needed.

The Russian Arctic region includes the following seas:

- Kara Sea;
- Laptev Sea;
- East Siberian Sea;
- Chukchi Sea (the Russian section).

The total coastal area in the region is 3 460 km², or one-fifth of the total Russian territory. The region's population of 770 200 is just 0.54% of the country's total population. At the same time, the area's natural and resource potential are so rich and diverse that the region's stocks of some resources (for example gas and oil) can be considered a significant part not only of the Russian but also of the world's resources. Industrial production in the Arctic region today is mainly (about 90%) composed of "dirty" activity: hydrocarbon extraction, the mineral resource industry, metal manufacturing, and the building materials industry.

The depletion of mineral deposits in Russia's middle latitudes and the increase in mineral prices makes it more and more attractive to exploit polar lands and seas. Some assessments have suggested that the polar economy will develop mostly as a result of the exploitation of hydrocarbon stocks. Sea and river navigation will expand, increasing the threat of contamination of Arctic waters.

At present the transboundary waters in the Arctic region are relatively clean, and the state of the pelagic ecosystems as a whole is favourable. However, the local shelf regions of the Arctic seas and most coastal zones are considerably polluted and the state of a number of bays, gulfs and estuarine areas has been assessed as critical and even in a catastrophic state. The main contribution to pollution in the Arctic seas is from diffuse, distant sources (river run-off and long-range atmospheric transport) and local sources located in high latitudes or directly on the Arctic coast. The major hazard facing the Arctic seas is the possibility

that oil and its components will enter marine ecosystems as a result of sewage discharges, accidental spills, navigation, and gas and oil production, especially directly on the shelf. Practically all petroleum hydrocarbons and HCHs in the Arctic seas (particularly the Kara Sea) are the results from run-off carried by the Ob and Yenisei Rivers.

The GIWA concerns are prioritised as follows:

1. Pollution
2. Habitat and community modification
3. Global change
4. Unsustainable exploitation of fish and other living resources
5. Freshwater shortage.

Due to substantial differences between the seas, the region is divided in two sub-systems: the Kara Sea sub-system and the Laptev Sea, East Siberian Sea and Chukchi Sea sub-system. The latter sub-system is relatively clean, and all issues have not known or slight environmental impacts. However in the Kara Sea sub-system, the following issues have moderate or severe impact: Pollution; Chemical pollution and Spills, and Habitat and Community Modification; Modification of ecosystem-Neritic, Lagoon and Estuarine systems.

The increase of negative impacts from chemical pollution, oil spills and modification of ecosystems in the Kara Sea basin can be linked to the following root causes:

Economic

- Chemical pollution: market reform failures and failures in strategic forecasting;
- Oil spills: market reform failures, growth of corruption in the oil extraction sector and the domination of corporate interests over strategic ones;
- Modification of ecosystems: inadequate funding of environmental needs, poor integration of environmental protection problems with socio-economic planning, domination of corporate interests over strategic problems.

Technological

- Chemical pollution: use of obsolete industrial technologies, absence of modern air and water decontamination systems;
- Oil spills: use of outdated equipment in oil extraction and transportation, aging transport fleet, insufficient emergency services;
- Modification of ecosystems: use of outdated equipment in minerals extraction, aging transporting fleet, outdated technologies for industrial waste neutralisation).

Governance

- All issues: insufficient control over environmental conditions, weak enforcement of ecological regulations;

Public control

- Chemical pollution: weak local control, especially indigenous peoples, over chemical pollution levels;
- Oil spills: weak local control over water pollution from oil extraction and transport companies;
- Modification of ecosystems: weak local control over chemical pollution levels, especially indigenous peoples.

Education and knowledge

- Chemical pollution: insufficient awareness of the local population about the principles of sustainable development as stated in Agenda 21; poor or inadequate access to environmental information;
- Oil spills: insufficient knowledge on the part of the local population about the principles of sustainable development as stated in Agenda 21, poor or inadequate access to environmental information, lack of experience with large-tonnage tanker navigation under Arctic conditions;
- Modification of ecosystems: insufficient knowledge on the part of oil/gas administrators and the local population about the principles of sustainable development as stated in Agenda 21, poor or inadequate access to environmental information; poor or inadequate investigation into problems caused by chemical pollution in the Arctic seas ecosystems.

Legal

- Absence of sound regulatory and legislative systems for all activity in the region with regard to sustainable development.

Political

- Chemical pollution: absence of an effective system for combating transboundary air and water pollution;
- Modification of ecosystems: absence of international cooperative programs and projects that follow sustainable development principles in the Arctic region.

The Causal chain analysis showed that the root causes of the three issues identified above are very similar. Therefore the Policy option analysis was conducted for all three issues together. The policy options detailed for the problems with chemical pollution, oil spills and modification of ecosystems in the Russian Arctic region are based on the policies adopted at the World Summits on sustainable development held in

Rio de Janeiro (1992) and Johannesburg (2002). Russian legislation concerning environmental protection and sustainable development was also employed.

The main measures identified in the Policy option analysis are designed not only to preserve and restore the water ecosystems in the region, but also to reduce polluting substances in the air and water. Another goal is to aid the local population with its struggle with poverty, as well as to increase the level of education, while lowering the growth in costs of public health services.